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CONTROL OF A LARGE FLEXIBLE
SPACE STRUCTURE USING MULTIPLE MODEL
ADAPTIVE ALGORITHMS

THESIS

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THESIS

Presented to the Faculty of the School of Engineering
of the Air Force Institute of Technology
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Requirements for the Degree of
Master of Science in Electrical Engineering

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Preface

The purpose of this thesis is to apply the optimal performance of the moving-bank multiple model adaptive estimation and control (MMAE/MMAC) algorithms to an actual space structure (SPICE) being examined at Phillips Laboratory at Kirtland AFB, New Mexico. Implementing a bank of filters increases the robustness of the LQG controller. The moving bank is used to decrease the computational load that would be required for full-scale implementation of the multiple model adaptive estimator/controller. Results of this thesis indicate that the MMAE/MMAC algorithms should definitely be considered as a viable option in the development of a robust controller for the SPICE structure, especially when parameter values vary.

The research performed here would not have been completed without the encouragement, guidance, time and wisdom that Dr. Peter Maybeck supplied. I wish to humbly thank him. To Major Robert Riggens and Captain Randall Paschall, I wish to thank them for their time and suggestions during this endeavor. For his patience and time, I extend my appreciation to Mr. Delano Carter for allowing me the opportunity to "pick his brain" about the simulation of the SPICE structure. I would like to thank fellow students of the Guidance and Control curriculum for allowing me to "throw ideas at" them and for the suggestions and encouragement given. Finally, but first in my heart, I would like to express my deepest gratitude and love to my family for their undying support and patience throughout the AFIT experience. Thank you Cathy, Daylene (7), and Phillip (4). God bless all the people mentioned and inadvertently overlooked for your support.

John Arthur Gustafson

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Abstract

The development and performance of moving-bank multiple model adaptive estimation (MMAE) and control (MMAC) algorithms for quelling vibrations induced in the SPICE 2 space structure are analyzed in this thesis. The structure consists of a large platform and a smaller platform connected by three legs in a tripod fashion.

The model supplied by Phillips Laboratory, Kirtland AFB is used to develop a truth model and multiple reduced ordered filter models. The filter models are developed from modal analysis and internally balanced techniques. Deviations of the line-of-sight vector from the center of the large platform to the center of the smaller platform are used for LQG controller performance evaluation.

For use with the LQG controller, research results indicate the chosen reduced order models are of inadequate dimension and that the full ordered filter model should be implemented to quell vibrations introduced into the structure. The parameter estimator implemented the ME/I algorithm, the moving-bank logic employed parameter position monitoring and the controller used the modified MMAC method. Parameter variations of two percent caused instabilities in the single filter/controller design. The MMAE/MMAC algorithms provide an excellent method to estimate a wide range of parameter variations and to quell oscillations in the structure.

CONTROL OF A LARGE FLEXIBLE SPACE STRUCTURE USING MULTIPLE MODEL ADAPTIVE ALGORITHMS

I. Introduction

Linear Kalman Filters are commonly implemented to determine the optimal estimation of a state for cases in which the parameters that define the underlying dynamics model, measurement model, and noise statistics are known with certainty. A problem arises when the parameters that describe a state are not known precisely but take on a range of values. This uncertainty in the parameters can adversely affect the system model. The uncertain parameter values may be constant, vary slowly, or jump over time. Certain methods for tuning a linear Kalman filter for robustness (to cover the range of parameter values) may degrade the Kalman filter's performance in estimating the state at design conditions [14:198]. Multiple Model Adaptive Estimation (MMAE) is a technique that will reduce the effects of these uncertain parameters [21:129]. The basic principle is to generate a Kalman filter for each discrete (or discretized) value of the vector of uncertain parameters. Each Kalman filter is generated for an assumed parameter value. These filters are then set up in a parallel configuration (called a bank) with the outputs of each filter probabilistically weighted, to indicate the probability that the specific filter-assumed parameter value is correct (as assessed on the basis of the characteristics of the residuals in each of the filters in the bank), and summed to form the optimal estimate of the state. A diagram of the MMAE is displayed in Figure 1.1. This figure illustrates a bank of parallel Kalman filters, where each filter provides a state estimate and residual value for an assumed parameter value. Each filter residual is then processed by the hypothesis conditional probability computation, which provides a probability weighting factor for the corresponding state estimate. The probability weighting factor and state estimate for each state are multiplied together, and these products then summed to form the MMAE state estimate as a probability-weighted average.

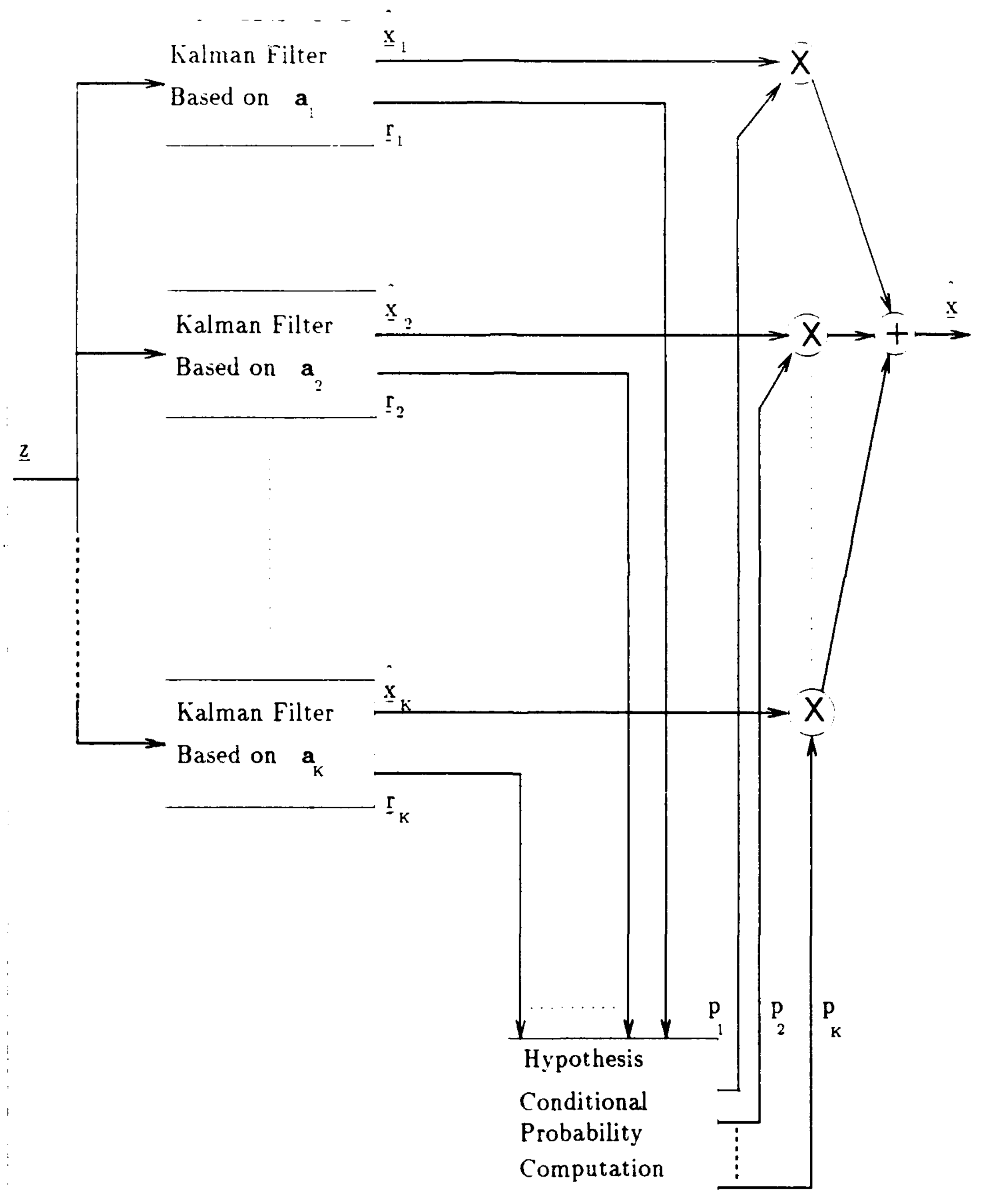

Figure 1.1. Diagram of Multiple Model Adaptive Estimator [21:132]

The MMAE technique is not without its drawbacks. The number of values a parameter can assume corresponds directly to the number of Kalman filters required in the bank. Parameters that take on a range of continuous real values would require an infinite number of filters. To reduce this physically unrealizable number of filters, the parameter range (space) is discretized. The number of Kalman filters (full bank) necessary after discretizing the space is equivalent to the number of parameter points in the space. Thus, the number of Kalman filters required for a parameter space could be considerable.

The moving-bank MMAE monitors only a small portion of the total discretized parameter space so defined at any one time. Thus, the number of filters required for the moving bank is less than the number of filters in the full bank. The smaller set of filters surround the current parameter estimate. By dynamically redeclaring which are the appropriate filters to include in the current bank, the moving bank can maintain the true parameter estimate, if the parameter is moving, within the bounds of the moving bank.

This thesis will employ controllers based on **L**inear system models with a **Q**uadratic cost control criterion driven by white **G**uassian noises (LQG). The basic configuration of the estimator and controller is a separate controller cascaded behind each filter of the MMAE, as illustrated in Figure 1.2. The output of each controller can then be weighted appropriately (as discussed previously) and summed to form the optimal control estimate.

Reducing the number of states each Kalman filter and/or controller needs to estimate and/or control will aid in the reduction of the computational burden on the system. When reducing the number of states, it is important to ensure that modes which have significant impact on performance are not eliminated, thus tradeoffs between performance and computational loading must be monitored when selecting the state dimension. Caution must be applied to ensure that proper tuning of the Kalman filter is implemented in order not to cloud the adaptation process. The addition of pseudonoise in tuning the filters compensates for the model inadequacies, but may also mask the differences between filters when determining which filter best represents the true parameter value.

This thesis will implement the moving-bank estimator and LQG controller discussed previously to control a large, flexible space structure. For the first time through the design process, the model implemented in the design of the estimator

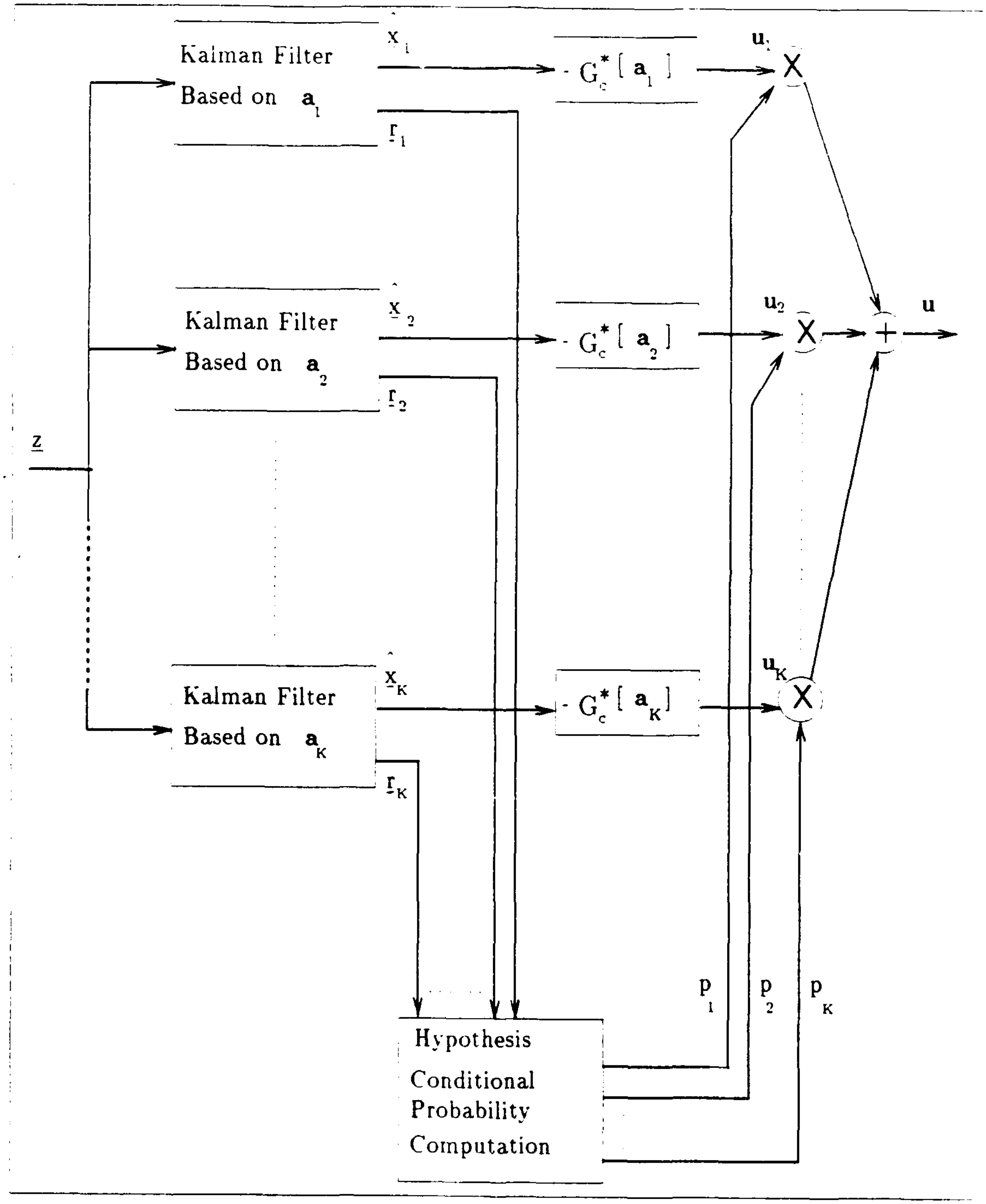

Figure 1.2. Diagram of Multiple Model Adaptive Controller [22:254]

and controller will be the actual total structure model. This will be followed by reduced-order designs. The primary concern of this thesis is to quell any vibrations induced in the structure and to move the structure to a desired orientation.

1.1 Background

This section will provide a basic foundation in order to understand the major areas of concern for this research. The areas of concern are as follows: (1) the system model, (2) Multiple Model Adaptive Estimation (MMAE), (3) Moving-bank MMAE, and (4) Moving-bank Multiple Model Adaptive Controller (MMAC). Notation in this thesis will follow the convention found in [20], such that a stochastic process is denoted as $\underline{\mathbf{x}}$ while a deterministic process is denoted by $\mathbf{x}$.

1.1.1 System Model. The physical model employed in past research by Karnick [11], Lashlee [14], Van Der Werken [34], Shore [30], and Moyle [29] will be presented in this section. Although the actual model that this research will implement contains a larger number of states and its physical shape is different, the primary steps in the development of the previous model hold for the development of the new model.

The physical shape of the original model is a two-bay truss structure. This structure is connected, rigidly, at one end to a much larger structure at the hub. The hub (with the attached hub truss structure) is allowed to rotate with respect to inertial space in a planar fashion. Figure 1.3 displays a diagram of the two-bay truss model. As seen in that figure, there are sensors located at three positions on the structure. There are two accelerometers paired together at each of the indicated points on the structure and a pair of gyros at the hub. These sensors are assumed to measure position and velocity (angular position and velocity at the hub). Also colocated with each pair of sensors are actuators (thrusters), which are used to generate the physical output required to quell any vibrations in the structure. Lastly, at the hub is an inertia wheel which is the input device used to reposition the truss; it also affects the bending modes.

Early research used a six-state truth model and a six-state filter model [11, 14]. A 24-state truth model was later developed to reduce the number of unmodeled states and thereby enhance the accuracy of the truth model, while maintaining a six-state filter model [34]. These models were developed from mass and stiffness matrices

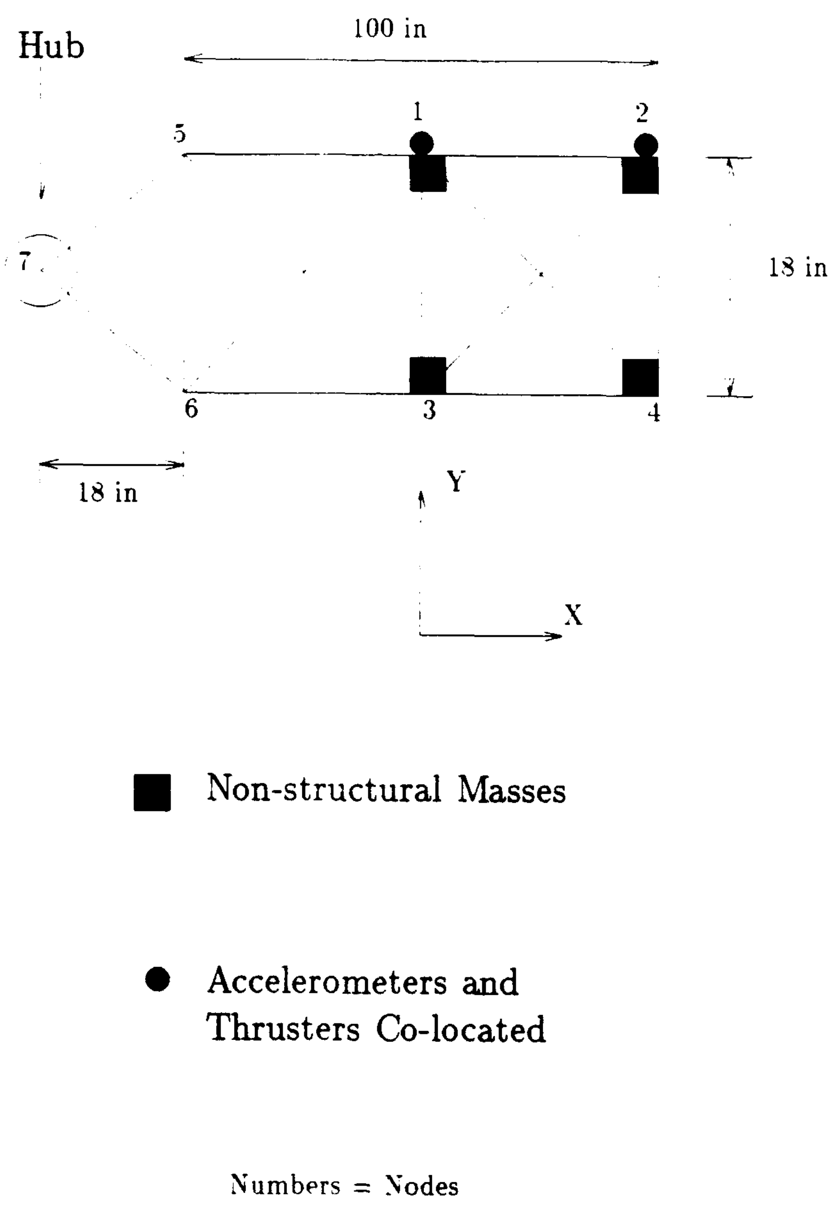

Figure 1.3. Diagram of Rotating Two-Bay Truss Model

which describe the physical structure of the truss. The mass and stiffness matrices were obtained from finite element analysis [36].

1.1.2 Multiple Model Adaptive Estimation. The motive for using MMAE techniques is that there are times when the parameters associated with a state model are not completely known. The concept is to estimate the true parameter value simultaneously with the optimal state estimate. All the possible parameter values for the physical state lie in the parameter space. A Kalman filter must be developed for each parameter value in the space. As stated previously, to keep the number of Kalman filters to a realizable number, the parameter space is discretized. The discretization of the parameter space is obvious for parameters that are already discrete. When parameters do not take on discrete values but a range of real values, the way the space is discretized is important. As discussed in the introduction, the number of points in the parameter space equate to the number of Kalman filters required in the MMAE. Keeping the number of filters to a minimum is a concern. For example [24:16], given two parameters that may take on 2 separate discrete values, the parameter space contains 4 discrete points. Consider the same two uncertain parameters but now each can realize 100 separate parameter values. This parameter space would then require 10000 Kalman filters to determine the optimal state estimate. This number of filters would produce a computational burden for any on-line system. To overcome this overloading problem, the concept of a "moving-bank" MMAE will be implemented. Past research used two varying parameters, each with 10 possible values and thus a 100-point parameter space [14, 11, 34, 30, 29], within which the "moving bank" would operate.

Two outputs are taken from each Kalman filter. The first is the state estimate based upon the parameter value assumed by the filter and the second output is the residual. The residual is used to determine which of the filter models is most "correct." The filter model that best estimates the system's true state value will have a small residual magnitude and a filter model that does not estimate the state value as well will have a larger residual magnitude [21:133]. Each filter's residual value is utilized to determine a weighting factor for the corresponding state estimate, namely, the hypothesis conditional probability that the real parameter assumes the particular discrete value used as a basis for that filter design [25]. The conditional probability that is associated with a good filter model (small residual) will be greater

than the probability for a poor filter model (large residual) [21:133]. The conditional probabilities $p_k(t_i)$ for k = 1,2,....,K are determined by:

$$p_k(t_i) = \frac{f_{\mathbf{z}(t_i)|\mathbf{a},\mathbf{Z}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_k, \mathbf{Z}_{i-1}) p_k(t_{i-1})}{\sum_{j=1}^{K} f_{\mathbf{z}(t_i)|\mathbf{a},\mathbf{Z}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_j, \mathbf{Z}_{i-1}) p_j(t_{i-1})} \tag{1.1}$$

where $\mathbf{a}_k$ is each parameter value for k = 1,2,....,K and K is the number of Kalman filters.

The numerator of this equation contains two terms. The first is the probability density of the current measurement based on the assumed parameter value and the observed past measurement history. This probability density function is computed by:

$$\begin{aligned} f_{\mathbf{z}(t_i)|\mathbf{a},\mathbf{Z}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_k, \mathbf{Z}_{i-1}) &= \frac{1}{(2\pi)^{\frac{m}{2}} \mid \mathbf{A}_k(t_i) \mid^{\frac{1}{2}}} \exp\{\cdot\} \\ \{\cdot\} &= \{-\frac{1}{2}\mathbf{r}_k^T(t_i)\mathbf{A}_k^{-1}(t_i)\mathbf{r}_k(t_i)\} \end{aligned} \tag{1.2}$$

where

- $\mathbf{r}_k(t_i)$ is the filter residual $\left[\mathbf{z}(t_i) - \mathbf{H}_k(t_i)\hat{\mathbf{x}}_k(t_i^-)\right]$
- $\mathbf{A}_k(t_i) = \left[\mathbf{H}_k(t_i)\mathbf{P}_k(t_i^-)\mathbf{H}_k^T(t_i) + \mathbf{R}_k(t_i)\right]$

The k^{th} filter residual, $\mathbf{r}_k(t_i)$, is dependent upon the current measurement, $\mathbf{z}(t_i)$, the measurement matrix $\mathbf{H}_k(t_i)$ and the state estimate, $\hat{\underline{\mathbf{x}}}_k(t_i^-)$, before the i^{th} measurement. The state estimation error covariance matrix before the i^{th} measurement, $\mathbf{P}(t_i^-)$, the measurement matrix and the noise covariance matrix, $\mathbf{R}_k(t_i)$, are used to construct $\mathbf{A}_k(t_i)$ [21:131]. The Kalman filter equations and notation are discussed in Chapter 2.

The denominator of Equation (1.1) represents the sum of the numerator terms computed at time, t_i. This ensures that the maximum value of the conditional probability density (weighting factor), p_k, is one and that the sum of the p_k's is always one. A concern exists with the weighting factor equation. If for any reason the conditional probability of a state estimate for a particular filter should become zero, the conditional probability density function, p_k, becomes "locked" at a zero value. Changing the real world conditions will not unlock the weighting factor of

zero, even if the filter is estimating a good state value. The cause of this effect is that Equation (1.1) multiplies the previous value of p_k by the first term in the numerator. A lower limit (threshold) is set to avoid the zero lock-in condition from occurring.

The adaptive state estimate is determined by taking the weighting factor multiplied with the corresponding filter estimate and summing the k values. This approach is displayed in Figure 1.1 and is termed the Bayesian form. Maximum a posteriori, MAP, is another method of determining the overall state estimate. This technique declares the single filter estimate with the highest probability weighting factor as the adaptive state estimate.

An alternative method for determining the conditional density functions is to assume that the residuals are Gaussian with a covariance equal to the identity matrix rather than $\mathbf{A}_k(t_i)$ [31:32]. This results in the following equation:

$$\begin{aligned} f_{\mathbf{z}(t_i)|\mathbf{a},\mathbf{Z}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_k, \mathbf{Z}_{i-1}) &= \frac{1}{(2\pi)^{\frac{m}{2}} \mid \mathbf{I} \mid^{\frac{1}{2}}} \exp\{\cdot\} \\ \{\cdot\} &= \{-\frac{1}{2}\mathbf{r}_k^T(t_i)\mathbf{I}\mathbf{r}_k(t_i)\} \end{aligned} \tag{1.3}$$

This equation is called the **M**aximum **E**ntropy with **I**dentity Covariance (ME/I) density computation [31, 32], and might be used in applications in which confidence in the computed $\mathbf{A}_k(t_i)$ value is low. This method will be discussed in more detail in Chapter 2.

1.1.3 Moving-Bank MMAE. A moving-bank MMAE was conceptualized to help reduce the computational load put on a system by a full bank of Kalman filters. The basic concept is to maintain a minimum number of filters active at one time. The true parameter value can only realize one value at any particular time. The filters nearest the true parameter will have the best estimates of the state and filters further away from the true parameter value will have poorer estimates of the states. Thus, deactivating the filters not in the immediate vicinity of the true parameter value should have little effect on the estimation of the state and have a positive effect in reducing the computational burden on the system. As the parameter varies, the smaller bank filters are dynamically redeclared, deactivating the filters away from the location of the assumed parameter and activating the filters nearest the true parameter. The smaller bank moves, attempting to maintain itself centered about

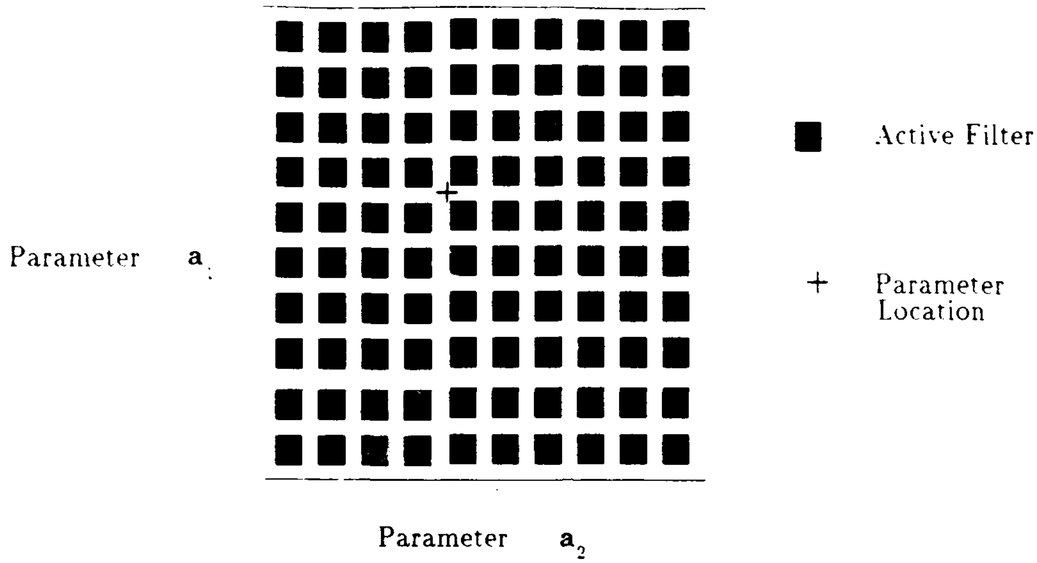

Figure 1.4. Diagram of Full-Bank MMAE

the true parameter value. Illustrated in Figure 1.4 is a full-bank MMAE with two uncertain parameters with 10 discretized values each. Each solid box represents an active filter at a discrete parameter point. Figure 1.5 displays a 3-by-3 moving-bank MMAE. This figure illustrates examples of a "fine" and a "coarse" configured moving-bank MMAE. Also displayed is how a moving-bank MMAE deactivates and activates filters.

As illustrated previously, the moving bank may be in a "fine" or "coarse" discretization. The fine discretization is when the active filters of the moving bank are located at adjacent discrete values in the parameter space, as shown in Figure 1.5(a). The coarse discretization is when the active filters are not adjacent to each other, as displayed in Figure 1.5(b). The decision to expand, contract, move or not move the bank can be accomplished with the following techniques: (1) Residual Monitoring, (2) Parameter Position Estimate Monitoring, (3) Parameter Position and "Velocity" Estimate Monitoring, (4) Probability Monitoring, and (5) Parameter Estimation Error Covariance Monitoring [26].

The *Residual Monitoring Technique* is used to move the bank and also expand the bank. The likelihood quotient is the basis of this technique. The likelihood quotient is defined as:

$$L_j(t_i) = \mathbf{r}_j^T(t_i)\mathbf{A}_j(t_i)^{-1}\mathbf{r}_j(t_i) \tag{1.4}$$

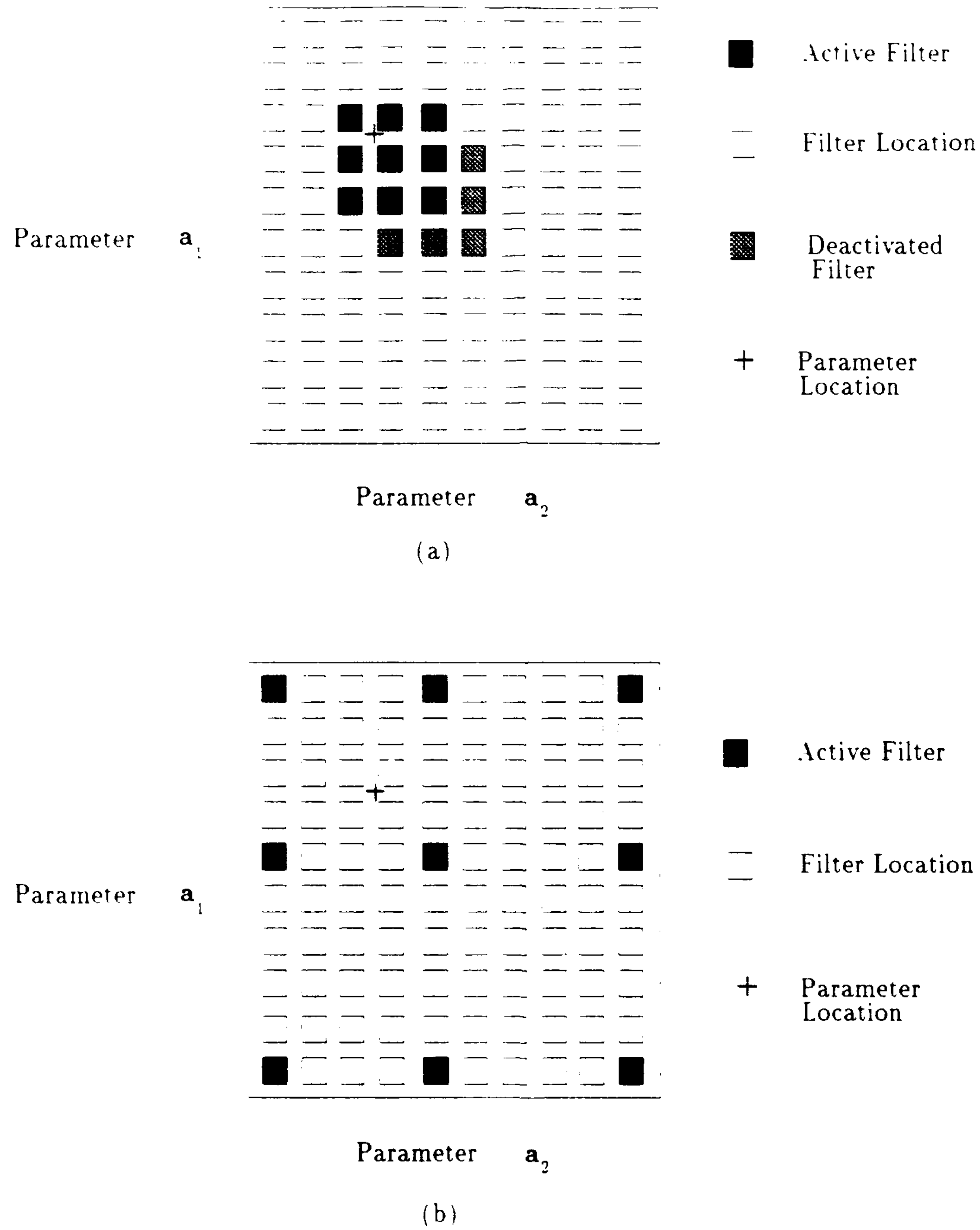

Figure 1.5. Diagram of Moving-Bank MMAE (a) Fine Discretization, and (b) Coarse Discretization

which is the major contributor of the exponential term in Equation (1.2). The value of this scalar function indicates if the bank needs to move. The smaller the value obtained from this function, the closer the parameter estimation is to the true parameter. The opposite is also true: the larger the value of the likelihood function, the further away from the true position the filter estimate is. This corresponds to the previous statement that the smaller the residuals, the closer the filter models the true system: and the larger the residuals, the poorer the filter models the true system. Thus, when all the moving-bank filters have a likelihood quotient value above some set threshold (none of the filters model the system very well), the bank will move and the movement will be in the direction of the active filter with the lowest likelihood quotient value. Bank expansion can be accomplished by setting a second threshold value at a larger value than the moving threshold value. This higher threshold value corresponds to a dramatic parameter jump variation and thus the likelihood quotient would increase abruptly and the bank should expand to a coarse discretization in order to relocate the parameter value so that the bank can contract about it in a fine discretization. A drawback to this technique is that a single large measurement noise quantity can cause an undesirable movement or expansion [26:1876], since the decision to move the bank is based on the magnitude of only the current residual.

The *Parameter Position Estimate Monitoring Technique* attempts to maintain the center of the moving-bank over the true parameter position. This technique employs the following equation:

$$\hat{\mathbf{a}}(t_i) = E\{\mathbf{a}(t_i) \mid \underline{\mathbf{Z}}(t_i)\} = \sum_{k=1}^{K} \mathbf{a}_k \cdot p_k(t_i) \qquad (1.5)$$

This equation ascertains an estimate of the true parameter's position by remembering the entire measurement history. The estimation of true parameter position and the parameter location corresponding to the center of the moving-bank are compared. If the difference between the two parameter positions is less than some set threshold the bank will not move, but if the difference is larger, then the bank will move. By estimating the parameter position over the entire measurement history instead of just the most recent past measurement, this technique is less likely to move when a single large measurement noise occurs, than the residual monitoring technique [26:1879].

The *Parameter Position and "Velocity" Estimate Monitoring Technique* is an extension of the previously discussed technique. The premise is to track the "velocity" of a slowly moving parameter. By examining the previous parameter position estimates, over a set time period, a velocity can be determined. This velocity value is used to predict the next parameter location. The decision to move the bank is determined by the distance between the new predicted parameter position and the current location of the center of the moving-bank. A threshold is set and if the threshold is violated the bank will move.

The *Probability Monitoring Technique* uses the probabilities computed in Equation (1.1). The probabilities of each of the filters are compared to a set threshold, and if the threshold is exceeded, the bank will move in the direction of the filter with the highest probability value.

The *Parameter Estimation Error Covariance Monitoring Technique* applies the parameter estimation error covariance matrix which is defined as:

$$\begin{aligned} \mathbf{P}_{\hat{\mathbf{a}}}(t_i) &= E\{[\mathbf{a} - \hat{\mathbf{a}}(t_i)]\,[\mathbf{a} - \hat{\mathbf{a}}(t_i)]^T \mid \mathbf{Z}(t_i) = \mathbf{Z}_i\} \\ &= \sum_{k=1}^{K} [\mathbf{a} - \hat{\mathbf{a}}(t_i)]\,[\mathbf{a} - \hat{\mathbf{a}}(t_i)]^T \cdot p_k(t_i) \end{aligned} \tag{1.6}$$

to determine when to have the bank move from a coarse discretization to a fine discretization. When the value of $\mathbf{P}_{\hat{\mathbf{a}}}$ drops below a specified threshold, the contraction will be implemented about the current parameter estimate.

1.1.4 Moving-Bank MMAC. The controller of choice for this thesis research and past research is the LQG controller. By employing this type of controller, it is being assumed the system is adequately modeled as **L**inear, the cost is of a **Q**uadratic form, and the system noises are **G**uassian. "The LQG optimal controller has the certainty equivalence property" [22:17]. This property allows for the replacement of actual plant states in a deterministic optimal full-state feedback LQ controller by the conditional mean estimates from a Kalman filter, to form the optimal stochastic controller under the conditions that all defining system parameters are known [25]. This property is ideal for MMAC application. Since each filter in the bank outputs a state estimate based on an assumed parameter value, cascading the controller gain

of an LQG optimal controller to each estimator is completely acceptable. Since the purpose of this research is to drive the position and velocity states to zero, a regulator form of the LQG controller will be implemented.

There is one LQG controller developed for each parameter value. The output of each controller is desired to be the optimal control function, $\mathbf{u}^*$, such that the quadratic cost function, defined as:

$$\begin{aligned} J &= E\left\{\sum_{i=0}^{N}\frac{1}{2}\left[\underline{\mathbf{x}}^T(t_i)\mathbf{X}(t_i)\underline{\mathbf{x}}(t_i) + \mathbf{u}^T(t_i)\mathbf{U}(t_i)\mathbf{u}(t_i) + 2\underline{\mathbf{x}}^T(t_i)\mathbf{S}(t_i)\mathbf{u}(t_i)\right]\right. \\ &\quad \left.+\frac{1}{2}\underline{\mathbf{x}}^T(t_{N+1})\mathbf{X}_f\underline{\mathbf{x}}(t_{N+1})\right\} \qquad (1.7) \end{aligned}$$

is minimized [22:73]. The quadratic cost function can also be written as:

$$J = E\left\{\sum_{i=0}^{N}\frac{1}{2}\left(\begin{bmatrix}\underline{\mathbf{x}}(t_i)\\ \mathbf{u}(t_i)\end{bmatrix}^{\mathrm{T}}\begin{bmatrix}\mathbf{X}(t_i) & \mathbf{S}(t_i)\\ \mathbf{S}^{\mathrm{T}}(t_i) & \mathbf{U}(t_i)\end{bmatrix}\begin{bmatrix}\underline{\mathbf{x}}(t_i)\\ \mathbf{u}(t_i)\end{bmatrix}\right) + \frac{1}{2}\underline{\mathbf{x}}^{\mathrm{T}}(t_{N+1})\mathbf{X}_f\underline{\mathbf{x}}(t_{N+1})\right\} \qquad (1.8)$$

where:

- J = scalar cost to be minimized
- $\underline{\mathbf{x}}(t_i)$ = n-dimensional state vector
- $\mathbf{X}(t_i)$ = $n-by-n$-dimensional state weighting matrix
- $\mathbf{X}_f$ = $n-by-n$-dimensional final state weighting matrix
- $\mathbf{u}(t_i)$ = r-dimensional control input vector
- $\mathbf{U}(t_i)$ = $r-by-r$-dimensional control weighting matrix
- $\mathbf{S}(t_i)$ = $n-by-r$-dimensional cross-weighting matrix
- t_N = last time a control is applied (held constant to next sample period)
- t_{N+1} = final time

The basic forms of $\mathbf{X}(t_i)$ and $\mathbf{X}_f$ are matrices that are real, symmetric and positive semi-definite. The semi-definite property allows a zero cost to states that have no impact on desired performance. The form of $\mathbf{U}(t_i)$ is real, symmetric and positive definite. The positive definite aspect keeps $\mathbf{U}(t_i)$ eigenvalues from becoming zero.

which corresponds to allowing infinite energy or infinite power to be commanded through the associated actuators [25]. The $\mathbf{S}(t_i)$ matrix is selected in a manner to ensure that the augmented matrix in Equation (1.8) is positive semi-definite in order to guarantee that a cost-minimizing controller solution exists.

For simplicity in explaining the weighting matrices, assume the matrices to be diagonal. The diagonal terms of the cost weighting matrices, $\mathbf{X}(t_i)$ and $\mathbf{X}_f$, determines how hard the controllerimportant it is to keep each component of the appropriate state vector, $\underline{\mathbf{x}}(t_i)$ and $\underline{\mathbf{x}}(t_{N+1})$, close to zero. The larger each term is made, the greater the effort exerted by the controller to keep the corresponding state near zero. The diagonal terms of the control weighting matrix, $\mathbf{U}(t_i)$, indicate how much control effort is to be used. The larger the diagonal values are, the smaller the amount of control power that is commanded through the actuators.

The optimal discrete linear feedback control law that corresponds to the certainty equivalence and quadratic cost function discussed earlier is [22:16]:

$$\mathbf{u}^*(t_i) = -\mathbf{G}_c^*(t_i)\hat{\underline{\mathbf{x}}}(t_i^+) \tag{1.9}$$

It should be noted that this equation contains the state estimate provided by an elemental Kalman filter based on the assumed parameter value [25]. A backward Ricatti difference equation is solved to determine the controller gain, $\mathbf{G}_c^*(t_i)$.

By assuming time invariant systems with stationary noise and ignoring the performance degradation due to the initial transients of the Kalman filter gains and the final transients of the controller gains, a steady state constant-gain control law can be developed. To maintain the accuracy of these assumptions, the control application time interval must have a duration that is much longer than the two transient periods. The optimal discrete linear feedback control law for this case is [22:243]:

$$\mathbf{u}^*(t_i) = -\overline{\mathbf{G}_c^*}\hat{\underline{\mathbf{x}}}(t_i^+) \tag{1.10}$$

where $\hat{\underline{\mathbf{x}}}(t_i^+)$ is the state estimate of a constant-gain, steady state Kalman filter. The constant-gain, steady state control law will be the approach taken in this research. Chapter 2 will discuss the formulation of $\overline{\mathbf{G}_c^*}$.

Six techniques are discussed on how to combine the MMAE and LQG controller. These techniques are: (1) MMAC Control, (2) Modified MMAC Control,

(3) MAP verses Bayesian MMAC control, (4) Single Fixed-Gain Controller Based on $\mathbf{a}_{nom}$, (5) Single Changeable-Gain Controller Based on $\hat{\mathbf{a}}(t_i)$, and (6) Modified Single Changeable-Gain Controller Based on $\hat{\mathbf{a}}(t_i)$.

MMAC Control cascades an elemental controller to each elemental filter of the bank. The optimal control output is determined similarly to the MMAE optimal estimate. Each controller output is weighted probabilistically and summed. A block diagram representing the MMAC is in Figure 1.2.

Modified MMAC Control eliminates control inputs from estimators with poor estimates. Recall that the computed p_k probabilities are lower-bounded to prevent the zero lock-in condition of Section 1.1.2 from occurring [25]. However, this yields a contribution from an inappropriate elemental controller to the adaptive control computed by the standard MMAC [25]. If the probability of a filter is larger than a threshold (which may be considerably higher than the lower bound), the corresponding controller is permitted to contribute to the overall control input. If the computed p_k is lower than the threshold, the corresponding controller is not permitted to contribute to the overall control input.

MAP versus Baysian Control is similar to MAP estimation. The controller with the greatest computed probability, p_k, will contribute the total control input for the system.

Single Fixed-Gain Control employs the fact that full-state feedback controllers are robust [10:40]. Figure 1.6 is a diagram of the single fixed-gain controller. Since the controller is robust, designing the controller around a nominal parameter value seems appropriate. The control is generated by:

$$\mathbf{u}^*(t_i) = -\overline{\mathbf{G}}_c^*[\mathbf{a}_{nom}]\,\hat{\underline{\mathbf{x}}}(t_i^+) \qquad (1.11)$$

Note that the only input in determining the control is the state estimate. Therefore, the controller parameters chosen must ensure that the controller regulates states corresponding to systems having any true parameter value appropriately [10:40]. The selection of $\mathbf{a}_{nom}$ may not be a simple task.

Single Changeable-Gain Control is displayed in Figure 1.7a. Only one controller gain $\overline{\mathbf{G}}_c^*$ is implemented, but it is expressed as a function of the parameter

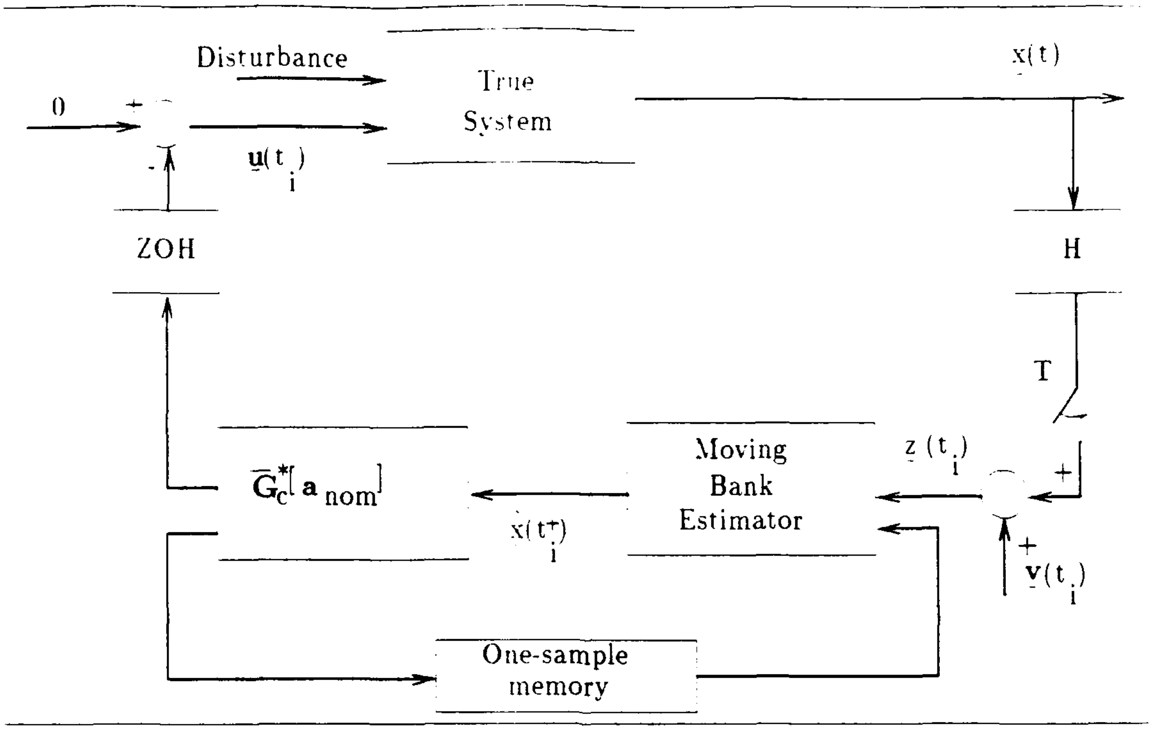

Figure 1.6. Diagram of Single Fixed-Gain Controller [10:41]

vector [25]. This controller uses both the state vector estimates and parameter vector estimates to determine the control output. The gain of the controller is dictated by the parameter estimates. Thus, the control is determined by:

$$\mathbf{u}^*(t_i) = -\overline{\mathbf{G}}_c^*[\hat{\mathbf{a}}(t_i)]\,\hat{\underline{\mathbf{x}}}(t_i^+) \tag{1.12}$$

For each point in the parameter space a $\overline{\mathbf{G}}_c[\mathbf{a}_k]$ is formed and placed in a table. This table is used to interpolate $\overline{\mathbf{G}}_c^*[\hat{\mathbf{a}}(t_i)]$ once $\hat{\mathbf{a}}(t_i)$ is generated by the MMAE algorithm [10:38].

Modified Single Changeable-Gain Control is displayed in Figure 1.7b. Although very similar to the previous technique, this controller implements a separate filter/controller above and beyond the MMAE algorithm, which is really used only to provide $\hat{\mathbf{a}}(t_i)$ [25]. The gains of the filter and controller are derived from the parameter estimate. This controller reduces the probability of generating adaptive control inputs on the basis of elemental filters of controllers that assume too low a value for the undamped natural frequency of vehicle bending modes [25]. Past research has shown that underestimation of the true natural frequency of the important bending modes for this application can produce instabilities [32].

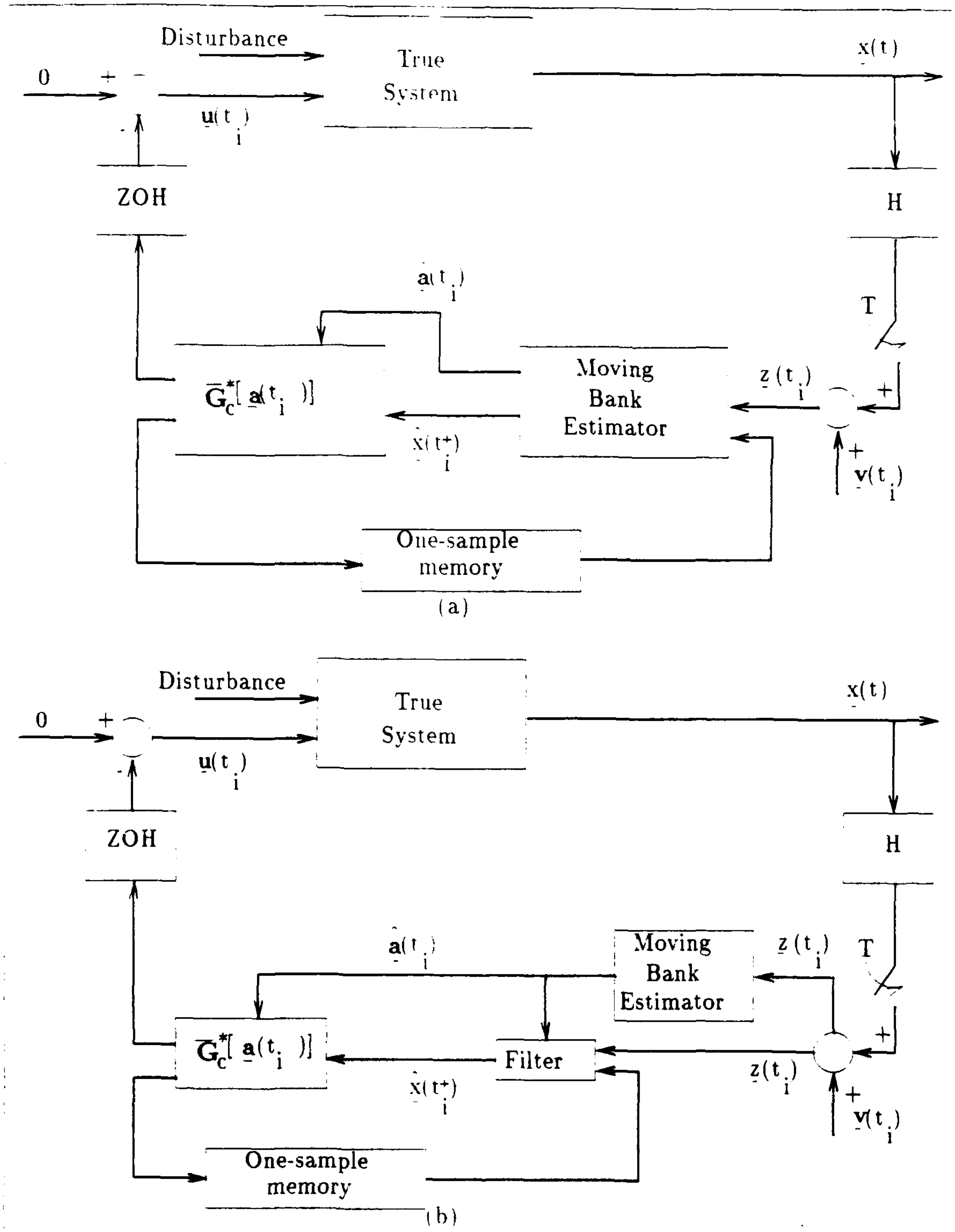

Figure 1.7. Diagram of Single Changeable-Gain Controller (a) Unmodified, and (b) Modified [10:37]

1.2 Past Research

The initial research, seven years ago, by Hentz displayed that the moving-bank MMAE performed very well when compared to the full-bank MMAE [10, 26]. The computational loading was also reduced by an order of magnitude [10]. This result is the foundation and impetus of the follow-on work in this area. Hentz also worked on algorithms to move the bank, expand the bank, and contract the bank. During the development of the moving-bank algorithms, Hentz investigated different threshold levels for moving, expanding, and contracting the bank. Hentz also investigated many of the control approaches that were described earlier.

Although the results of Filios' [6] research dictated that the system he had chosen didn't require adaptive estimation or adaptive control [6:93], he did demonstrate that using ambiguity function analysis to evaluate the performance of the estimator was insightful. Filios also investigated threshold levels for moving and contracting the moving-bank.

Karnick [11, 12] was the first to implement the two-bay truss structure as the system model. Karnick's results were not very promising. The results indicated that the moving-bank MMAE could at times estimate the system truth model states with reasonable precision, but could never identify the parameters [11:93]. The moving bank traversed the parameter space with no apparent pattern and convergence to a constant parameter value was not possible. Karnick also demonstrated that a coarsely discretized full-bank MMAE's performance was equivalent to a finely tuned moving-bank MMAE [11:92].

Lashlee [14, 15] investigated the problems that Karnick encountered. Lashlee's research centered on the tuning aspects of the design. He examined the dynamics noise strength, measurement noise strength, state weighting matrices and control weighting matrices. This investigation demonstrated that good and bad models must be clearly distinguishable to the moving-bank algorithm. Moreover, there is a bound on the measurement precision beyond which the moving-bank adaptation is ineffective. Lashlee also investigated the discretization of the parameter space. From this research, it was demonstrated that if an appropriately tuned filter model and appropriately discretized parameter space existed, the moving-bank MMAE was able to estimate the parameters accurately [14:199].

Van Der Werken [34] examined the performance degradation between the original 24-state truth model and the six-state model that Lashlee and Karnick had

employed [34:14]. The conclusions from this research indicated that the unmodeled states have a significant impact on the MMAE's capability to output accurate state estimates. Van Der Werken's results indicated that if the moving-bank was initialized on the wrong value, the moving-bank algorithm could not estimate the proper parameter values or state estimates [34:183].

Schore [27, 30] continued Van Der Werken's research, in order to determine if Van Der Werken's conclusion about the effects of the unmodelled states was correct and, if so, to determine the appropriate dimension for the reduced order model to attain adequate estimation. Schore discovered some software problems and developed a physically motivated approach to evaluate the reduced order filter model's performance. This approach examines the reduced order filter's estimate of the true total shape of the truss [30:Chapter 1 pg 22]. Schore then allowed higher order modal states to impact the system without being modeled in the filter/controller algorithms, and he evaluated the moving-bank algorithm's response. These results indicated the degradation due to the reduced order model was not great enough to increase the size of the six-state filter model.

Moyle [29] investigated the improvement of the moving-bank MMAE and control algorithms. The investigation covered enhancement of the software, tuning of the Kalman filters and LQG controllers, logic in the moving-bank algorithm, and parameter space discretization. The software examination resulted in a streamlined software algorithm, which resulted in a baseline performance that differed from past research. Tuning the filters to correct values demonstrated significant improvement in the estimation of the truss velocities and the rigid position [29:Chapter 6 pg 1]. The control and weighting matrices associated with the higher frequency bending modes were tuned properly, resulting in improved actuator performance. The study of the moving-bank logic algorithm indicated that the maximum entropy with identity assumed covariance, (ME/I), parameter position estimate monitoring and the modified MMAC techniques provided performance comparable to the non-adaptive artificially informed benchmark [29:Chapter 6 pg 2]. The space discretization study entailed packing the parameter estimates at the higher frequencies. This was investigated because Sheldon's results indicated that underestimation of higher modal frequencies resulted in poor controller performance for a fixed-bank multiple model algorithm [31]. Moyle's results indicated that the packing of the parameters had no effect in improving controller performance. The reason for no improvement in performance was primarily due to the space being finely discretized parameter points and

the ability of the moving-bank algorithms to estimate the true parameter value accurately. The overall result of Moyle's research is that designing an estimator with ME/I technique, implementing the parameter position estimate approach for the moving-bank algorithm, and generating a controller based on the modified MMAC method resulted in very good performance, especially when the filters and controllers are tuned properly for all points in the parameter space for the given application.

1.3 Problem Statement

The thrust of this thesis is to apply the moving-bank MMAE/MMAC of the two-bay truss structure to an actual total system structure. Implementation of the moving-bank algorithm versus the full-bank algorithm is intended to reduce the computational loading without degrading performance significantly.

1.4 Scope

This research is centered on quickly quelling oscillations that may be introduced in the actual space structure. The model representing the actual total structure will be of an increased state dimension compared to the state dimension of the two-bay structure examined in previous research efforts. The unknown parameters to be estimated are the structural stiffness and the non-structural masses [11, 35], which are the identical parameters estimated in previous research [11, 14, 34, 30, 29]. Research will begin with the development of a system model from which a truth model can be obtained.

1.5 Approach

The development of the MMAE/MMAC for the actual total structure will start at model development, progress to filter development, then to parameter space discretization, continuing to full- and moving-bank algorithm development and finally to controller development. These phases of development are now discussed in more detail.

Develop the system model for the truth model. The truth model requires that the system model be in modal form. The modal form allows for easier access to the states by decoupling the modes. If the system model received from Kirtland AFB is not in a modal form but in a physical form, then a transformation will be necessary.

This transformation will be accomplished with the aid of a software package available at the Flight Dynamics Laboratory.

Generate the Kalman filter for the truth model. The performance of the truth model Kalman filter will be used as a benchmark in analyzing the performance of algorithms based on simplified models. In developing the Kalman filter, determination of the noise strength, $\mathbf{Q}_{d_t}$, and measurement noise covariance, $\mathbf{R}_t$, is very important. The value of $\mathbf{Q}_{d_t}$ will indicate how well the filter will believe its own dynamics model [20:224]. Lashlee demonstrated that too large a value for $\mathbf{Q}_{d_t}$ may mask out the difference between the discrete parameter values that characterize the bending modes [14]. The value of $\mathbf{R}_t$ will indicate how much noise is corrupting the measurements [20:224]. Karnick and Lashlee [11, 14] demonstrated that there is a lower bound on the measurement precision beyond which adaptation is severely hampered. Each filter in the bank should be tuned to the discrete parameter value it is assuming to obtain the optimal response at design conditions. Therefore, in this step of the procedure, one Kalman filter representing a chosen parameter value will be generated for the truth model.

Develop reduced order models. To reduce computational loading, a reduced order model representing the truth model is necessary. Following Van Der Werken and Shore's technique to reduce the order of the model [34, 30], the eigenvalues tend to form "groupings" and thus form natural divisions which are where the groupings are then used to determine reduced order models. These divisions will be used to determine the number of states in each reduced order model developed. Two or three reduced order models will be developed. Other methodologies may be used to generate proposed reduced order models, such as internally balanced modeling [5:34] and modal cost analysis [22:181].

Generate Kalman filters for the reduced order models. A Kalman Filter will be developed for each of the reduced order models. Each of these filters will be tuned for the same parameter value that was used in tuning the truth model Kalman Filter. Each filter generated from the reduced order models will be tuned by the minimum variable reduced order (MVRO) technique. At this time, a performance analysis will be conducted between each of the reduced order models and the truth model.

Discretize the parameter space. Although Moyle [29:Chapter 6 pg 2] demonstrated that no significant improvement in performance occurred by discretizing the

parameter space as recommended by Sheldon [31]. this research may investigate Sheldon's methodology for this different application model [31]. Caution will be taken as not to pack the parameters so close at the higher frequencies that determining the difference between the elemental filters is impossible. Caution will also be implemented in the lower frequencies. ensuring that these filters are not tuned by increasing the dynamics pseudonoise to a level which inhibits the distinction between parameter values. The tradeoffs between raising the pseudonoise to yield robustness. packing the parameters at the higher frequency range. and selecting the frequency range will determine the number and location of point values of the discretized parameter space.

Develop Bayesian MMAE. Kalman filters, for the truth and reduced order models, will be determined for each parameter value in the parameter space. Performance analysis will be conducted for each parameter and filter. The results are expected to demonstrate similar characteristics as found from the previous performance analyses, namely the results acquired by Moyle [29:Chapter 5 pg 1-4]. Further research will be conducted in determining weighting factors, $p_k(t_i)$, by comparing the weighting factors determined by using the unaltered filter-computed covariance $\mathbf{A}_k(t_i)$ and with $\mathbf{A}_k(t_i)$ replaced with the identity matrix (ME/I approach). As demonstrated by previous research [10, 11, 14, 29, 30, 34], the best approach to avoid the "lock-out" condition while generating appropriate adaptive control is to use the modified MMAE approach when developing the estimator. This approach in developing the estimator will be implemented. The modified MMAE will be tested with slowly varying parameters and jump changes as well as constant parameter values.

Develop the moving-bank algorithm. This research will use the parameter position estimate monitoring approach that Moyle [29:Chapter 6 pg 2] executed. Initialization of the filters will follow previous research techniques [29:Chapter 2 pg 17-18]. Performance analysis will be conducted for the cases of constant parameters, slowly varying parameters and jump changing parameters. Contracted bank and expanded bank acquisition (and reacquisition) techniques will be investigated. Cases where $\mathbf{A}_k(t_i)$ is unaltered and replaced with the identity matrix will also be investigated.

Develop the stochastic controller. LQG techniques will be implemented in the design of the controller. Moyle demonstrated good results by tuning the state and control weighting matrices for specific areas of the parameter space [29:Chapter 6 pg

2]. This research will also implement this technique. A performance analysis will be conducted for all the different cases: constant, slowly or jump varying parameters, and unaltered versus ME/I $\mathbf{A}_k(t_i)$ techniques.

1.6 Summary

This chapter briefly discussed the purpose of MMAE, moving-bank MMAE and MMAC. The discussions also described the basic operating and development approaches for the moving-bank MMAE and MMAC. The two-bay truss structure was described with the note that this research will investigate a different structure. Also provided were the results of previous research in the development of the MMAE/MMAC for the two-bay truss structure. This chapter ended with a statement of the problem and the scope that this research will investigate, followed by a general approach with which to solve the stated problem. Chapter 2 will discuss the MMAE and LQG controller algorithms used in this research, Chapter 3 will develop the models for the actual total structure, Chapter 4 will discuss simulations, Chapter 5 will contain results from this research, and Chapter 6 will review conclusions determined in this research and provide recommendations for future research.

II. Algorithm Development

2.1 Introduction

The algorithm previously developed for the two-bay truss structure will be appropriately altered for the an actual total structure. The modifications will not affect the basic format of the algorithm. This chapter will review the generation of the Kalman filter, the MMAE, the moving-bank MMAE, and the LQG controller algorithms. This review is meant to provide a more complete presentation of these algorithms than the overview in Chapter 1. A more thorough presentation of these algorithms is found in references [20, 21, 22].

2.2 Kalman Filter

The system to be studied for this research is assumed to be adequately modelled as a linear, continuous, stochastic system with linear sampled-data measurements. By making these assumptions, a Kalman filter may be implemented for estimating the uncertain states. The system model upon which the Kalman filter is based is given by:

$$\dot{\underline{\mathbf{x}}}(t) = \mathbf{F}(t)\underline{\mathbf{x}}(t) + \mathbf{B}(t)\mathbf{u}(t) + \mathbf{G}(t)\underline{\mathbf{w}}(t) \tag{2.1}$$

where $\underline{\mathbf{x}}(\cdot)$ represents an n-dimensional state vector, $\mathbf{u}(\cdot)$ is an r-dimensional deterministic control input vector, $\underline{\mathbf{w}}(\cdot)$ is an s-dimensional white Gaussian noise vector, $\mathbf{F}(\cdot)$ is an n-by-n dimensional system dynamics matrix, $\mathbf{B}(\cdot)$ is an n-by-r dimensional deterministic input matrix, and $\mathbf{G}(\cdot)$ is an n-by-s dimensional noise input matrix. The underbar indicates a random variable or stochastic process.

The white Gaussian noise has a statistical description defined as:

$$E\{\underline{\mathbf{w}}(t)\} = \mathbf{0} \tag{2.2}$$

$$E\{\underline{\mathbf{w}}(t)\underline{\mathbf{w}}(t')^T\} = \mathbf{Q}(t)\delta(t - t') \tag{2.3}$$

where $\mathbf{Q}(\cdot)$ is an s-by-s dimensional matrix that is symmetric and positive semi-definite, and represents the strength of the dynamics noise entering the system. $\delta(t)$ is the Dirac delta function.

Since the system representation given in Equation (2.1) is a differential equation, the initial conditions of the states are then necessary to obtain a solution. The initial conditions are that $\underline{\mathbf{x}}(t_0)$ is a Gaussian random vector with a known mean and covariance. Its mean is given by:

$$E\{\underline{\mathbf{x}}(t_0)\} = \hat{\mathbf{x}}_0 \tag{2.4}$$

This initial condition is the "best guess" of the state's initial condition. Thus it is necessary to supply a covariance matrix, $\mathbf{P}_0$, to indicate the accuracy of the initial state estimate. The covariance matrix is given by:

$$E\left\{[\underline{\mathbf{x}}(t_0) - \hat{\mathbf{x}}_0][\underline{\mathbf{x}}(t_0) - \hat{\mathbf{x}}_0]^T\right\} = \mathbf{P}_0 \tag{2.5}$$

$\mathbf{P}_0$ is a positive, semi-definite, symmetric matrix.

The Kalman filter algorithm will be implemented on a computer, thus a discretized form of the propagation equation is required. There are two approaches to obtain the discretized form of the Kalman filter equation. The first is to develop the continuous filter equation from the system model and then to discretize the filter equation. The design method of choice is the second method [20:261], which is to discretize the system model first and then develop the discrete filter on the basis of the discretized model:

$$\underline{\mathbf{x}}(t_i) = \mathbf{\Phi}(t_i, t_{i-1})\underline{\mathbf{x}}(t_{i-1}) + \mathbf{B}_d(t_{i-1})\mathbf{u}(t_{i-1}) + \mathbf{G}_d(t_{i-1})\underline{\mathbf{w}}_d(t_{i-1}) \tag{2.6}$$

where $\mathbf{\Phi}(t_i, t_{i-1})$, is the solution to:

$$\dot{\mathbf{\Phi}}(t_i, t_{i-1}) = \mathbf{F}(t)\mathbf{\Phi}(t_i, t_{i-1}) \tag{2.7}$$

$$\mathbf{\Phi}(t_i, t_{i-1}) = \underline{0} \tag{2.8}$$

integrated from t_{i-1} to t_i. It can be evaluated simply for the case of constant $\mathbf{F}$ in Section (2.1) as:

$$\mathbf{\Phi}(t_i, t_{i-1}) = \mathbf{\Phi}(t_i - t_{i-1}) = \mathcal{L}^{-1}\left\{[s\mathbf{I} - \mathbf{F}]^{-1}\right\}\big|_{(t_i - t_{i-1})} \tag{2.9}$$

Also assuming that $\mathbf{u}$ is held constant from one sample period to the next, the deterministic input matrix $\mathbf{B}_d(t_{i-1})$ is given by:

$$\mathbf{B}_d(t_{i-1}) = \int_{t_{i-1}}^{t_i} \mathbf{\Phi}(t_i, \tau)\mathbf{B}(\tau)d\tau \tag{2.10}$$

The discrete-time, white Gaussian system dynamics noise vector, $\underline{\mathbf{w}}_d(t_{i-1})$, is characterized by statistics:

$$E\{\underline{\mathbf{w}}_d(t_{i-1})\} = \mathbf{0} \tag{2.11}$$

$$E\{\underline{\mathbf{w}}_d(t_{i-1})\underline{\mathbf{w}}_d(t_j)^T\} = \mathbf{Q}_d(t_{i-1})\delta_{(i-1)j} \tag{2.12}$$

where $\delta_{(i-1)j}$ is the Kronecker delta function. $\mathbf{Q}_d(t_{i-1})$ is defined as:

$$\mathbf{Q}_d(t_{i-1}) = \int_{t_{i-1}}^{t_i} \mathbf{\Phi}(t_i, \tau)\mathbf{G}(\tau)\mathbf{Q}(\tau)\mathbf{G}^T(\tau)\mathbf{\Phi}^T(t_i, \tau)d\tau \tag{2.13}$$

The filter obtains the measurements, $\underline{\mathbf{z}}$, at discrete times (or sampled times). The measurement model is defined as:

$$\underline{\mathbf{z}}(t_i) = \mathbf{H}(t_i)\underline{\mathbf{x}}(t_i) + \underline{\mathbf{v}}(t_i) \tag{2.14}$$

where $\underline{\mathbf{z}}(\cdot)$ is an m-dimensional discrete-time measurement vector, $\mathbf{H}(t_i)$ is an m-by-n dimensional output matrix and $\underline{\mathbf{v}}(t_i)$ is an $\mathbf{m}$-dimensional noise vector representing the uncertainty of the measurements. The measurement noise vector, $\underline{\mathbf{v}}(t_i)$, is modelled as white Gaussian noise with the following characteristics:

$$E\{\underline{\mathbf{v}}(t_i)\} = \mathbf{0} \tag{2.15}$$

$$E\{\underline{\mathbf{v}}(t_i)\underline{\mathbf{v}}(t_j)^T\} = \mathbf{R}(t_i)\delta_{ij} \tag{2.16}$$

where $\mathbf{R}(t_i)$ is an m-by-m-dimensional, symmetric, positive definite matrix and δ_{ij} is the Kronecker delta function. Since $\mathbf{R}(t_i)$ is positive definite, all elements of the measurement vector are noise corrupted. The measurement model assumes that the noise $\underline{\mathbf{w}}$(t) and $\underline{\mathbf{v}}(t_i)$ are uncorrelated [20:205].

Once the filter has been updated at time t_{i-1}, the propagation algorithm is invoked to output the best estimate (prediction) of the state just prior to the next

measurement. This is accomplished by propagating from the most recent measurement update time, t_{i-1}^{+}, to just before the next measurement is accepted, t_i^{-}. The "+" and "-" superscripts associated with the argument indicate whether the variable of interest was updated with the latest measurement or propagated forward awaiting that next measurement, respectively. The equations are given as [20:220]:

$$\hat{\mathbf{x}}(t_i^-) = \mathbf{\Phi}(t_i, t_{i-1})\hat{\mathbf{x}}(t_{i-1}^+) + \mathbf{B}_d(t_{i-1})\mathbf{u}(t_{i-1}) \tag{2.17}$$

$$\mathbf{P}(t_i^-) = \mathbf{\Phi}(t_i, t_{i-1})\mathbf{P}(t_{i-1}^+)\mathbf{\Phi}^T(t_i, t_{i-1}) + \mathbf{G}_d(t_{i-1})\mathbf{Q}_d(t_{i-1})\mathbf{G}_d^T(t_{i-1}) \tag{2.18}$$

After a measurement is obtained, the Kalman filter update and propagation algorithms begin processing. The update equations are given as:

$$\mathbf{K}(t_i) = \mathbf{P}(t_i^-)\mathbf{H}^T(t_i)\left[\mathbf{H}(t_i)\mathbf{P}(t_i^-)\mathbf{H}^T(t_i) + \mathbf{R}(t_i)\right]^{-1} \tag{2.19}$$

$$\hat{\mathbf{x}}(t_i^+) = \hat{\mathbf{x}}(t_i^-) + \mathbf{K}(t_i)\left[\mathbf{z}(t_i) - \mathbf{H}(t_i)\hat{\mathbf{x}}(t_i^-)\right] \tag{2.20}$$

$$\mathbf{P}(t_i^+) = \mathbf{P}(t_i^-) - \mathbf{K}(t_i)\mathbf{H}(t_i)\mathbf{P}(t_i^-) \tag{2.21}$$

The term in the bracket of Equation (2.20) is called the residual (or innovations) [20:228] and is designated $\mathbf{r}(t_i)$. Examining the bracketed term indicates that the residual is the difference between the measurement and the best estimate of that measurement based on its past history, thus the residual can be used to produce an error correction to the best previous estimate of the state in question. Before the residual is added to the best previous estimate, it is weighted by the Kalman filter gain, $\mathbf{K}(t_i)$, and the sum represents the new best estimate of the state. It can be shown [20:229] that the residual sequence is zero-mean, white Gaussian noise with a covariance equivalent to the bracketed term in Equation (2.19). The covariance of the residual is the same as the $\mathbf{A}_k(t_i)$ matrix used in determining the probability density shown in Equation (1.2)

All the propagation and update equation elements, except $\hat{\mathbf{x}}_0$, $\mathbf{P}_0$, $\mathbf{Q}_d(t_i)$ and $\mathbf{R}(t_i)$, are known from the system model structure, measurement inputs or are computed from known elements. Assigning values to the initial conditions and the noise covariances is called "tuning". As discussed earlier, the magnitudes that $\mathbf{Q}_d(t_i)$ and $\mathbf{R}(t_i)$ assume indicates how accurately the system model is modeling the true dynamics of the system (and how much wide-band disturbance drives the system) and

how much noise and uncertainty are in the measurement, respectively. As stated in Chapter 1, Lashlee [14:198] demonstrated that adding pseudonoise to protect against elemental filter divergence will cause the MMAE to perform poorly if the values of the pseudonoise are so large that the noise masks out the difference between the discrete parameter values. For the optimum performance, each filter should be tuned to the case of attaining the best possible estimation performance at its design conditions, where the assumed parameter value equal to the true parameter value [23:7]. The technique to determine values for $\mathbf{R}(t_i)$ of the reduced order models for best performance at parameter design conditions will be the **M**inimum **V**ariance **R**educed **O**rder (MVRO) technique [34].

Assuming that systems are time invariant with stationary noises, a filter performance is described as an initial transient stage in $\mathbf{P}(t_i)$ and $\mathbf{K}(t_i)$ followed by a steady-state stage [20:224]. Therefore, if performance degradation is minimal in the transient stage, then a steady-state constant-gain approximation can be used for all time. Also as a result of this assumption, steady-state values of $\mathbf{P}(t_i^+)$ from Equation (2.21), $\mathbf{P}(t_i^-)$ from Equation (2.18), and $\mathbf{K}(t_i)$ from Equation (2.19) can be precomputed. Values for $\mathbf{B}_d(t_{i-1})$ and $\mathbf{Q}_d(t_{i-1})$ matrices of Equations (2.10) and (2.13) need only be computed once for a time invariant system with stationary noises and a fixed sample rate. The measurement noise covariance, $\mathbf{R}(t_i)$, for this research will be assumed constant.

2.3 Bayesian MMAE

The basic description of the MMAE algorithm was presented in Chapter 1. Although the following discussion is given for completeness, a thorough presentation is found [21:129-139].

An uncertain parameter, **a**, can affect the estimation of a state by making it difficult to determine the matrices which describe the system, since deterministic knowledge of the parameter values is necessary to obtain highest precision for the state estimation. This is the purpose of the Bayesian estimator, to compute the conditional density of $\underline{\mathbf{x}}(t_i)$ and **a** given the measurement history:

$$f_{\underline{\mathbf{x}}(t_i),\mathbf{a}|\underline{\mathbf{Z}}(t_i)}(\boldsymbol{\xi},\boldsymbol{\alpha} \mid \mathbf{Z}_i) = f_{\underline{\mathbf{x}}(t_i)|\mathbf{a},\underline{\mathbf{Z}}(t_i)}(\boldsymbol{\xi} \mid \boldsymbol{\alpha},\mathbf{Z}_i) f_{\mathbf{a}|\underline{\mathbf{Z}}(t_i)}(\boldsymbol{\alpha} \mid \mathbf{Z}_i) \qquad (2.22)$$

where $\mathbf{Z}_i$ is composed of partitions equal to the realizations of $\underline{\mathbf{z}}(t_1)$, $\underline{\mathbf{z}}(t_2)$, ..., $\underline{\mathbf{z}}(t_i)$. The parameter, $\mathbf{a}$, is defined over the continuous range:

$$A \subset R^p \tag{2.23}$$

where R^p is real euclidean p-dimensional space. Since $\mathbf{a}$ can assume any value over a continuous range, an infinite number of Kalman filters would be required to represent every possible point value in A. Since an infinite number of filters is not feasible, the parameter space will be discretized. The result is that the parameter value, $\mathbf{a}$, will take on a finite set of values $\{\mathbf{a}_1, \mathbf{a}_2, \ldots, \mathbf{a}_K\}$, which are located throughout a space of reasonable parameter values. A Kalman filter algorithm is generated for each parameter, $\mathbf{a}_k$.

Examining Equation (2.22), the first term on the right is the Gaussian density function that is totally definable in terms of the $\hat{\mathbf{x}}(t_i^+)$ and $\mathbf{P}(t_i^+)$ produced by each Kalman filter generated assuming that $\mathbf{a} = \boldsymbol{\alpha}$. The second term is given as:

$$f_{\mathbf{a}|\underline{\mathbf{Z}}(t_i)}(\boldsymbol{\alpha} \mid \mathbf{Z}_i) = \sum_{k=1}^{K} p_k(t_i)\delta(\boldsymbol{\alpha} - \mathbf{a}_k) \tag{2.24}$$

and $p_k(t_i)$ is the hypothesis conditional probability that $\mathbf{a} = \mathbf{a}_k$, conditioned on the observed measurements to time t_i, as discussed in Chapter 1. The adaptive filter produces a conditioned mean state estimate defined as [21:131]:

$$\begin{aligned} \hat{\mathbf{x}}(t_i^+) &= E\{\underline{\mathbf{x}}(t_i) \mid \underline{\mathbf{Z}}(t_i) = \mathbf{Z}_i\} \\ &= \int_{-\infty}^{\infty} \boldsymbol{\xi} \left[\sum_{k=1}^{K} f_{\underline{\mathbf{x}}(t_i)|\underline{\mathbf{a}},\underline{\mathbf{Z}}(t_i)}(\boldsymbol{\xi} \mid \mathbf{a}_k, \mathbf{Z}_i) p_k(t_i)\right] d\boldsymbol{\xi} \\ &= \sum_{k=1}^{K} \hat{\mathbf{x}}_k(t_i^+) \cdot p_k(t_i) \end{aligned} \tag{2.25}$$

where $\hat{\mathbf{x}}_k(t_i^+)$ is the state estimate produced by the Kalman filter generated for the parameter $\mathbf{a}_k$, and $p_k(t_i)$ is the probabilistic weighting factor discussed in Chapter 1. The sum of the probabilistically weighted estimates determined from the K Kalman filters is the state estimate.

The conditional covariance of the state has a probability-weighted sum form similar to Equation (2.25), and is given by [21:131]:

$$
\begin{aligned}
\mathbf{P}(t_i^+) &= E\left\{\left[\underline{\mathbf{x}}(t_i) - \hat{\mathbf{x}}(t_i^+)\right]\left[\underline{\mathbf{x}}(t_i) - \hat{\mathbf{x}}(t_i^+)\right]^T \mid \underline{\mathbf{Z}}(t_i) = \mathbf{Z}_i\right\} \\
&= \sum_{k=1}^{K} p_k(t_i)\left\{\mathbf{P}_k(t_i^+) + \left[\hat{\mathbf{x}}_k(t_i^+) - \hat{\mathbf{x}}(t_i^+)\right]\left[\hat{\mathbf{x}}_k(t_i^+) - \hat{\mathbf{x}}(t_i^+)\right]^T\right\} \qquad (2.26)
\end{aligned}
$$

The conditional covariance $\mathbf{P}_k(t_i^+)$ is the "state error covariance" associated with the Kalman filter based on the parameter $\mathbf{a}_k$. Unlike the $\mathbf{P}_k(t_i^+)$ values, the conditional covariance $\mathbf{P}(t_i^+)$ is not precomputable due to its dependence on the measurement history, but the conditional covariance is not necessary for on-line use in the MMAE algorithm.

The parameter value, $\mathbf{a}$, at a given time, t_i, can be estimated by the following conditional mean value [21:132]:

$$
\begin{aligned}
\hat{\mathbf{a}}(t_i) &= E\{\mathbf{a}(t_i) \mid \underline{\mathbf{Z}}(t_i) = \mathbf{Z}_i\} \\
&= \int_{-\infty}^{\infty} \boldsymbol{\alpha} f_{\mathbf{a}|\underline{\mathbf{Z}}(t_i)}(\boldsymbol{\alpha} \mid \mathbf{Z}_i)\, d\boldsymbol{\alpha} \\
&= \sum_{k=1}^{K} \mathbf{a}_k \cdot p_k(t_i) \qquad (2.27)
\end{aligned}
$$

The covariance of the estimated parameter vector gives an indication of the precision of the estimate, and the covariance can be determined by [21:133]:

$$
\begin{aligned}
\mathbf{P}_{\hat{\mathbf{a}}} &= E\{[\mathbf{a} - \hat{\mathbf{a}}(t_i)][\mathbf{a} - \hat{\mathbf{a}}(t_i)]^T \mid \underline{\mathbf{Z}}(t_i) = \mathbf{Z}_i\} \\
&= \sum_{k=1}^{K} [\mathbf{a}_k - \hat{\mathbf{a}}(t_i)][\mathbf{a}_k - \hat{\mathbf{a}}(t_i)]^T \cdot p_k(t_i) \qquad (2.28)
\end{aligned}
$$

The calculation of the parameter estimate vector and its associated covariance calculation are not necessary in determining the state estimate [21:133].

The *Multiple Model Adaptive Estimation Algorithm* developed above is an adaptive filter structure and was shown in Figure 1.1. The discussion that follows will discuss the fundamental performance of the MMAE algorithm based on elemental filter residual generation and will also discuss the performance of the MMAE with respect to varying parameters.

The residuals of the K elemental filters, as discussed previously, determine how well the MMAE will perform. The filter closest to the actual parameter location is expected to output a residual value with the smallest magnitude (relative to the filter-computed residual covariance, $\mathbf{A}_k(t_i)$) of the active bank of filters. Equation (1.2) will provide the largest conditional density value for this particular filter and thus Equation (1.1) will provide the largest probability value for this ("the best") filter. A problem occurs if all the relative residuals are of the same magnitude, i.e., all of the quadratic forms within the exponentials of Equation (1.2) are of the same magnitude. The $| \mathbf{A}_k(t_i) |$ with the smallest value will artificially boost the probability of the corresponding elemental filter, thus weighting the state estimate from that filter too heavily. Since all the probability weights sum to unity, all the probabilities are then erroneous [21:133].

The replacement of the $\mathbf{A}_k(t_i)$ term throughout Equation (1.2) with the identity matrix is another form of computing the conditional density function. The replacement assumes that the residuals are Gaussian with a covariance equal to the identity matrix. It is assumed that the residuals follow a "maximally non-committed residual distribution" [31:32]. This density function is called the Maximum Entropy with Identity covariance (ME/I) density computation and is given by [31:24]:

$$f_{\mathbf{z}(t_i)|\mathbf{a},\mathbf{Z}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_k, \mathbf{Z}_{i-1}) = \frac{1}{(2\pi)^{\frac{m}{2}} \mid \mathbf{I} \mid^{\frac{1}{2}}} \exp\{-\frac{1}{2}\mathbf{r}_k^T(t_i)\mathbf{I}\mathbf{r}_k(t_i)\} \quad (2.29)$$

The ME/I density computation ensures that the residual with lowest (absolute vs. relative) magnitude will be given the highest probability, $p_k(t_i)$, value. Moyle [29:Chapter 5 page 8] investigated another way to compute the conditional density function of Equation (1.2). This procedure entailed replacing the leading coefficient $\mathbf{A}_k(t_i)$ term with the identity matrix and leaving the exponential $\mathbf{A}_k^{-1}(t_i)$ as it is. Moyle demonstrated that, of the three techniques to compute the conditional density, the ME/I approach provided the best results [29:Chapter 6 page 2].

The discretization of the parameter space has been investigated by Hentz [10:20], Lashlee [14:81], Sheldon [31], Sheldon and Maybeck [32], and Moyle [29:Chapter 6 page 2]. Moyle determined that, since the space he was investigating was already discretized finely and since he was using a moving-bank MMAE/MMAC algorithm,

densely packing discretized parameter values at the higher frequencies had no significant beneficial effect. Such dense packing at the higher frequencies was useful for fixed-bank MMAC algorithms [31, 32].

The performance of the MMAE algorithm to varying parameters is discussed next. "Lock out" is a problem that can occur as the result of any one of the elemental filter's probability weighting factors, $p_k(t_i)$, becoming zero. Since Equation (1.1) is iterative, the value of $p_k(t_i)$ cannot assume a value other than zero once $p_k(t_j)$, for $t_j < t_i$, becomes zero. Thus, the MMAE would ignore the filter's estimate even if the true parameter varied from being poorly represented by that elemental filter's assumed parameter value to being well represented by the same.

There are two possible approaches to avoid lock out. The first is to add dynamics pseudonoise to the assumed model for each elemental filter [21:25]. As discussed previously, the addition of pseudonoise can tend to mask out differences between the models. The second approach is to create a lower threshold, p_{min}, for $p_k(t_i)$. The hypothesis conditional probabilities are monitored and when $p_k(t_i)$ exceeds the lower threshold, $p_k(t_i)$ is set to a minimum value and the remaining probabilities are rescaled to keep the unity sum. The second approach has been the approach in past research [10, 11, 14, 29, 30, 34]. A note of caution: not adding enough pseudonoise to the individual elemental filters can cause the filters based on "incorrect" parameter values to diverge in a real application. This divergence problem can be overcome by reinitializing the divergent filters with state estimates from the nondivergent filters in the bank [25].

2.4 *Moving-Bank MMAE Development*

The MMAE algorithm discussed previously is a full-bank algorithm. The full-bank algorithm requires a Kalman filter for every discrete parameter point. This can result in a heavy computational load for a processor. A technique to alleviate this burden is to implement a moving bank of filters. The moving-bank algorithm activates only J number of filters at any one time, where J < K. The technique of using a moving-bank MMAE was originally investigated by Maybeck and Hentz [26]. This section will discuss techniques for moving the bank, expanding the bank, contracting the bank, and initializing new filters.

2.4.1 Moving the Bank. The moving-bank MMAE, as explained earlier, implements a subset of the full-bank MMAE's elemental filters and allows dynamic redeclaration of which subset is to be maintained at the current time. The concept is to keep the moving bank centered around the best estimate of the parameter in parameter space. The parameter value may not be known a priori or the parameter value may change. If the parameter estimate is determined to be outside the bounds of the current bank, the bank will need to encompass the parameter estimate by either moving the bank in a finely discretized configuration to the parameter estimate or by expanding the bank in a coarsely discretized configuration to surround it. This section will discuss four decision logics used to keep the moving bank centered about the estimated parameter value. The four decision logics are: (1) residual monitoring, (2) parameter position monitoring, (3) parameter position and "velocity" monitoring, and (4) probability monitoring. The threshold values referenced in this discussion are determined through empirical parameter evaluation, or "tuning".

2.4.1.1 Residual Monitoring. The exponential term of the probability density function discussed in Equation (1.2) is affected by a quadratic factor of the residual vector and $\mathbf{A}_j$, which is itself a function of $\mathbf{H}_j$, $\mathbf{R}_j$, and $\mathbf{P}_j(t_i^-)$. In Section 1.1.2, this exponential term was defined as the likelihood quotient, $L_j(t_i)$. The likelihood quotient, in the scalar case, is the ratio of the residual squared divided by the filter-computed variance for the residual [26:1876]. A parameter value outside the moving bank will result in high residual values and these values will then drive all J likelihood quotients high. The filter closest to the true parameter will have the lowest likelihood quotient, and thus provide the direction to move the bank. To distinguish when the true parameter point is within the active bank of filters or outside the active bank of filters (when to move the bank), a threshold can be set at a level such that, when the smallest likelihood quotient of the moving-bank filters exceeds the threshold, the bank moves. Caution must be taken in setting the threshold value. Too high a threshold value will slow down the response of the moving-bank, and a threshold value set to low will cause the moving bank to move erratically through parameter space and to fail in maintaining proper estimation of the true parameter [10:61]. A single large measurement noise can cause the likelihood quotients to rise substantially, degrading the performance potential of this method relative to some of the alternatives that consider more than the current single sample time [26:1876].

2.4.1.2 Parameter Positioning Monitoring. This technique attempts to maintain the center of the bank over the estimated parameter value obtained from Equation (2.27). When the estimated parameter position varies from its current location, the bank moves to maintain the center of the bank as close to the estimated value as possible. If the distance from the center of the bank to $\hat{\mathbf{a}}(t_i)$ becomes larger then some chosen threshold, a move of the bank in that direction is applied. This technique is less susceptible to single, large sampled, measurement noises since Equation (2.27) is dependent on the history of the measurements. However, this technique requires some a priori information about the parameter when initializing the moving bank. Initialization techniques will be discussed later. It should be noted that centering the moving bank over the estimated parameter cannot be accomplished at the edge of the parameter space and still maintain a complete set of active filters in the moving bank; thus the side of the moving bank will be centered over the parameter estimate under these conditions.

2.4.1.3 Parameter Position and "Velocity" Monitoring. Similar to the previous technique, this approach estimates the position and "velocity" vectors in parameter space of a slowly varying parameter. The change in parameter location over a sample period or extended amount of time, divided by the time increment, is the "velocity". This velocity vector is then used to estimate the parameter's position one sample period into the future. If the estimated location is beyond a set threshold distance from the current center of the bank, then the bank can move in the direction of the velocity vector. Hentz discovered that this method resulted in no improvement in speed to acquire, and also showed a destabilization of the bank's position in the parameter space [10:62].

2.4.1.4 Probability Monitoring. This technique attempts to center the bank over the true position by monitoring the hypothesis conditional probabilities computed by Equation (1.1). The $p_k(t_i)$ with the highest value corresponds to the filter closest to the true parameter. If the highest value of $p_k(t_i)$ is greater than a set threshold, the bank will move in the direction of the filter with the highest $p_k(t_i)$ value. Probability monitoring is dependent on the time history of measurements, and thus large unexpected changes in measurement noise at single sample times has minimal effect on the bank movement.

2.4.2 Expanding the Bank. Keeping the moving bank of filters in an adjacent finely discretized formation is not necessary. By allowing the active filters of the moving bank to be dispersed, in a set pattern, the moving bank will act as a coarsely discretized moving bank. A coarsely discretized moving-bank configuration was shown in Figure 1.5(b). Although the parameter estimation of a coarse bank of filters is poor in resolution compared to a fine bank of filters, the probability of the parameter being located within the area covered by the coarse bank of filters is greater.

Expansion of the bank is convenient to do for two different cases. The first is when a parameter's location jumps to a new location. Using residual monitoring, a jump change in parameter location will cause the likelihood quotient (as in Section 1.1.3) of the active filters to exceed a set expansion threshold. This, in turn, causes the finely discretized moving bank to expand. Residual monitoring is used to determine when expansion of the bank is necessary since estimation of the parameter location and the probability monitoring cannot provide the necessary information to expand the bank (these computations confine $\hat{\mathbf{a}}(t_i)$ to lie within the current small bank). The second case for desiring the coarsest discretization of the bank is for initial acquisition. For initialization of the bank, Maybeck and Hentz found that an initial coarse discretization of the bank improved parameter estimation [26], as compared to forcing a small, finely discretized bank to move to a distant location in parameter space.

Hentz determined that if the expansion threshold was set too high, the bank would wait too long to expand, and if the threshold was set too low, the bank would expand unnecessarily [10:69]. It is also desired that the coarsely discretized bank encompass the entire parameter space. This ensures that the parameter value will be located within the bank. The problem with sudden erroneous measurement noise using residual monitoring for bank movement also exists for bank expansion. A spike in the measurement noise will cause the bank to expand inappropriately.

2.4.3 Contracting the Bank. Contraction of the bank may occur in the following two scenarios: (1) initial acquisition and (2) following expansion due to a jump parameter change. Using the covariance of the parameter estimate, Equation (2.28), contraction of the bank can be determined. When the covariance of the parameter estimate falls below a threshold, the bank will contract about the parameter

estimate. This contraction of the bank can be done in multiple steps or in one step. Hentz determined that if the contraction threshold was set too high, the bank contracted before a good parameter was obtained: setting the threshold too low caused the bank to contract late, thus degrading performance of the estimator while in the coarse configuration. [10:69].

The covariance of the parameter estimate in this research will be a two-by-two matrix. This causes a problem in comparing $\mathbf{P}_{\hat{\mathbf{a}}}$ with a scalar threshold. Hentz used the largest element of $\mathbf{P}_{\hat{\mathbf{a}}}$ to compare with the threshold used to contract the bank [10:64]. Filios [6] found better results by requiring both elements of $\mathbf{P}_{\hat{\mathbf{a}}}$ to be below the threshold level before contraction was allowed. Filios' technique required tradeoffs since the threshold level for one variance may not be appropriate for the other variance. The threshold that Filios implemented was also sensitive to the probability weighting lower bound, p_{min}, used to ensure the bank avoided the lock-out condition.

Karnick proposed an alternate method in which the probability of a side of a bank was monitored in that

$$p_{\text{side}}(t_i) = \frac{\sum_{\text{side}} f_{\underline{\mathbf{z}}(t_i)|\underline{\mathbf{a}},\underline{\mathbf{Z}}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_j, \mathbf{Z}_{i-1})}{\sum_{4 \text{ sides}} f_{\underline{\mathbf{z}}(t_i)|\underline{\mathbf{a}},\underline{\mathbf{Z}}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_j, \mathbf{Z}_{i-1})} \tag{2.30}$$

is the probability corresponding to each side [11:27-29]. If the probability of a side falls below a threshold, the side is moved inward towards the center of the bank, thus decreasing the size of the bank. "Conversely, if the probability associated with a side rises above some threshold the remaining sides are 'moved in'" [11:29]. Another method is evaluating the probabilities of all four sides, and when the sum of the four probabilities fall below a threshold the bank is contracted. This method corresponds to the idea that, the larger the probability, the closer the side (in this case) is to the true parameter value.

2.4.4 Initialization of New Elemental Filters. New elemental filters are activated when a bank moves, expands, contracts, or the system is "turned on". An activation of a new filter involves a changing of the $\mathbf{\Phi}$, $\mathbf{B}_d$, $\mathbf{G}_d$, $\mathbf{H}$, $\mathbf{A}_k$, $\mathbf{D}$, $\mathbf{K}$, $\mathbf{P}(t_i^-)$, and $\mathbf{P}(t_i^+)$ for the filter and $\overline{\mathbf{G}}_c^*$ for the controller corresponding to the new parameter point. The direct feedthrough matrix, $\mathbf{D}$, is a result of the reduced order model development; this will be discussed further in Chapter 3. The new filter also requires an initial state estimation, $\hat{\mathbf{x}}_j(t_i)$, and an initial probability weighting, $p_j(t_i)$.

Changing the filter and controller matrices to correspond to the new parameter value is done by retrieving the previously stored values from memory. The value of $\hat{\mathbf{x}}_j(t_i)$ is set to the current adaptive estimate of the state, $\hat{\mathbf{x}}(t_i^+)$. Assigning an initial $p_j(t_i)$ can be done by several techniques [11:29-32].

One technique is to set all of the current moving-bank (changed and unchanged) filters to equivalent probability weightings; i.e., setting all p_k values to [1/K]. This technique demonstrated a slow convergence to a parameter estimate. Another technique is to redistribute the deactivated filter probabilities equally among the newly activated filters. Hentz offered a third technique, which is to reassign the probabilities of the deactivated filters based on the "correctness" of the new filters [10:29]. Hentz's algorithm:

$$p_{J_{ch}}(t_i) = \frac{f_{\mathbf{z}(t_i)|\mathbf{a},\mathbf{Z}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_j, \mathbf{Z}_{i-1})}{\sum_{ch} f_{\mathbf{z}(t_i)|\mathbf{a},\mathbf{Z}(t_{i-1})}(\mathbf{z}_i \mid \mathbf{a}_j, \mathbf{Z}_{i-1})} \left[1 - \sum_{unch} p_j(t_i)\right] \tag{2.31}$$

where ch=changed and unch=unchanged elemental filters, determines a new filter's "correctness" based on the new filter's probability density function value for the current measurement, relative to the sum of the changed filters' probability density function values. The additional computational loading required for this technique and the result of no significant performance improvement over the technique of equally redistributing the discarded probabilities [6:76] displays little reason to implement Hentz's technique.

For the case of the bank expanding, setting the probability weightings to the same value for all the filters is reasonable since the old weightings may no longer be valid. A note to remember is that the sum of the probability weightings of the bank must be equal to one.

Hentz researched a warmup period for new filters before they were brought online. This warmup period allowed initial transients in state estimates and conditional densities to dissipate before being incorporated into the MMAE output. Hentz's results demonstrated no improvement in performance when the filter was allowed this warmup period [10:100].

Several different stochastic controller designs may be implemented with moving-bank and fixed-bank algorithms. The "assumed certainty equivalence design" methodology presented by Maybeck [22:241-245] will be employed with each controller design. Each controller generated will be a linear, quadratic-cost, full-state feedback optimal deterministic controller designed to a specific assumed parameter value, $\mathbf{a}_k$. The desired output of the controller is the optimal control function, $\mathbf{u}^*$, where the quadratic cost function is minimized to cause proper reaction from the closed loop system (quickly quelling any bending vibrations).

Assuming a time invariant, linear system driven by white Gaussian noise with a quadratic cost function described by Equation (1.7) and constant weighting matrices, then the constant-gain steady-state control law described in Equation (1.10) becomes [22:242]:

$$\overline{\mathbf{G}}_c^* = \left[\mathbf{U} + \mathbf{B}_d^T \overline{\mathbf{K}}_c \mathbf{B}_d\right]^{-1} \left[\mathbf{B}_d^T \overline{\mathbf{K}}_c \mathbf{\Phi} + \mathbf{S}^T\right] \tag{2.32}$$

where $\mathbf{K}_c(t_i)$ is determined by solving the steady-state Riccati equation:

$$\overline{\mathbf{K}}_c = \mathbf{X} + \mathbf{\Phi}^T \overline{\mathbf{K}}_c \mathbf{\Phi} - \left[\mathbf{B}_d^T \overline{\mathbf{K}}_c \mathbf{\Phi} + \mathbf{S}^T\right]^T \left[\mathbf{U} + \mathbf{B}_d^T \overline{\mathbf{K}}_c \mathbf{B}_d\right]^{-1} \left[\mathbf{B}_d^T \overline{\mathbf{K}}_c \mathbf{\Phi} + \mathbf{S}^T\right] \tag{2.33}$$

The assumptions of steady-state operation and constant weighting matrices reduces the quadratic cost function to:

$$J = E\left\{\sum_{i=0}^{\infty} \frac{1}{2}\left[\underline{\mathbf{x}}(t_i)^T \mathbf{X} \underline{\mathbf{x}}(t_i) + \mathbf{u}^T(t_i) \mathbf{U} \mathbf{u}(t_i) + 2\underline{\mathbf{x}}^T(t_i) \mathbf{S} \underline{\mathbf{u}}(t_i)\right]\right\} \tag{2.34}$$

Previous research results indicated that the cross weighting matrix, $\mathbf{S}$, had a small magnitude value [14], therefore $\mathbf{S}$ was set to zero with no appreciable performance impact. The selection of the weighting matrices, $\mathbf{X}$ and $\mathbf{U}$, is vital for proper controller performance. Tuning of the $\mathbf{X}$ and $\mathbf{U}$ weighting matrices will be accomplished for specific $\mathbf{a}_k$ parameter values in a coarse discretization with interpolation used to determine the weighting matrices for the controllers that are not directly tuned. The weighting matrices will be directly tuned following the procedure described by Moyle in [29:Chapter 5 page 54-55]. This procedure held $\mathbf{U}$ constant and increased $\mathbf{X}$ until rms values of the true states stopped decreasing drastically. The matrix $\mathbf{X}$ was next held constant while $\mathbf{U}$ was increased until no drastic decreases were seen in rms of

the controls. Thus, tuning was accomplished on the basis of sensitivity of gains to tuning value variations, with the overall objective being to achieve very tight control of the bending modes without saturating the actuators. The size of **X** directly corresponds to the desire to quell out oscillations (larger values, then larger desire) and the values of **U** are made large enough to avoid excessive control magnitudes.

The techniques available for controller implementation with the MMAE are the MMAC, modified MMAC, MAP verus Bayesian MMAC, and modified single-changable gain controller. These techniques were discussed in Section 1.1.4.

2.6 Summary

This chapter reviewed the concepts that are important in this research. The foundation of the research, the Kalman filter algorithms, were discussed, followed by Bayesian MMAE development. The MMAE discussion produced the moving-bank MMAE concept. The moving-bank presentation included decision logics to move, expand, and contract the moving bank of filters. Lastly, a brief development of the LQG controller was discussed. The most vital aspects from this chapter for future use is knowing what simplifying assumptions were made for this research and the assumptions are: the system for this research will be modelled by time invariant models driven by stationary noise; a constant state weighting matrix and a constant control weighting matrix will be used to define the quadratic cost for LQG controller synthesis; and steady-state Kalman filter (neglecting initial filter transients), steady-state LQG controller gains (neglecting terminal controller transients) will be employed. The following chapter will develop the actual total structure this research will implement.

III. System Development

3.1 Introduction

The system model discussion in Chapter 1 provided the background on the integration process of a structure with the MMAE and controller. This chapter will present a brief physical description of the actual structure that this thesis will employ.

A description of the complete system will be presented which includes the modelling of the disturbances, actuators and sensors. Also the integration of the components will be explained. The desired mathematical model representation and the received mathematical model of the structure will be discussed. The structure's truth model, the reduced-order models and the methods to develop these models will be presented. Finally, the discretization of the uncertain parameter space will be discussed.

3.2 SPICE Structure

The structure under examination is model two of the **SP**ace **I**ntegrated **C**ontrol **E**xperiment (SPICE) structure [16:Chapter 3]. The model was received from Phillips Laboratory, Kirtland Air Force Base, New Mexico. Presently, the Phillips Laboratory is developing a new representation, model three, of the SPICE structure, which will account for new strut joints and reduce the number of approximations made in model two.

Later, a fourth, fifth and sixth model will be developed. This changing model representation for the SPICE structure does *not* diminish the aspects of this research. The research being done will provide indication of the effectiveness of MMAE and controller algorithms in quelling vibrations induced in the SPICE structure.

3.2.1 Physical Description. The SPICE structure consists of 486 elements onnected at 371 nodes and can be divided into three major structural sections, as illustrated in Figure 3.1. The hexagonal base of the structure, also called the bulkhead, is 6.19 meters in diameter and has a mirror mounted upon it. The three legs (tripod) connect the bulkhead to the smaller secondary mirror assembly (SMA)

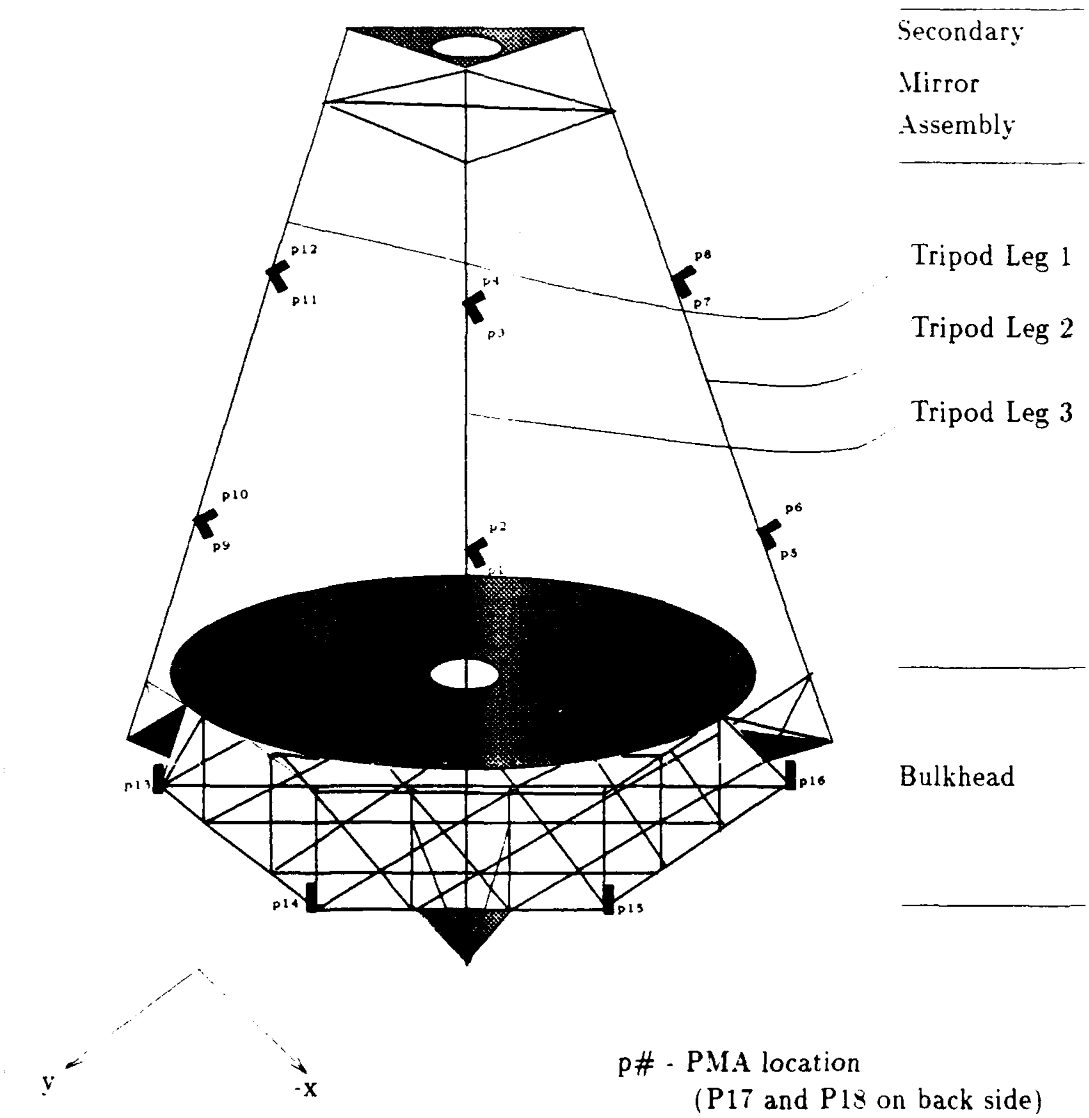

Figure 3.1. SPICE Structure Diagram [16:III-14]

which is 1.32 meters in diameter and whereupon a smaller mirror is mounted. The overall height of the structure is 8.14 meters.

Ensuring the SMA and the bulkhead are aligned is of vital importance, thus measuring and reducing linear and angular displacement is the purpose of the sensors and actuators. An exaggerated example of the bulkhead and SMA not being aligned is shown in Figure 3.2. Note that the alignment is not altered by a pure torsional force about the line of sight axis.

3.2.2 Actuators and Sensors. The actuators employed are called proof mass actuators (PMA). A PMA has a mass that is moved by an electro-magnetic force. This mass is moved to inhibit the bending of the structure at the PMA's location. There are 18 PMAs located on the structure. Six are mounted in a vertical position at each of the "hexagonal points" on the bulkhead. The remaining 12 PMAs are located on the tripod. Each leg of the tripod has an x-axis and y-axis (see Figure 3.1 for definition of axis directions) PMA located at one-third and two-thirds the length of the leg. Accelerometers are used to measure the bending of the structure induced by disturbances entering the structure. There are 18 accelerometers, one collocated with each PMA. There are also assumed to be six disturbances, one entering at each of the six ends of the tripod.

3.3 System Description

This section will describe the individual components of the system and the contribution each has on the complete system. A block diagram of the complete system is displayed in Figure 3.3. From the figure, the only block with a measurement output vector is the accelerometers. The PMA's, disturbance, and structure blocks can be crudely viewed as one large state model since the outputs of these blocks are not measured. The line-of-sight (LOS) block determines the alignment error in the 'x' and 'y' coordinates which are used for error analysis. The LOS information will not be used as measured quantities for feedback in the controller, but the LOS variables will be explicitly weighted in the formulation of the cost for the LQG controller synthesis.

3.3.1 Disturbances. The shaping filter that forms the disturbance inputs, n, passes white noise over the 31.416 to 62.832 radians per second (rps) frequency

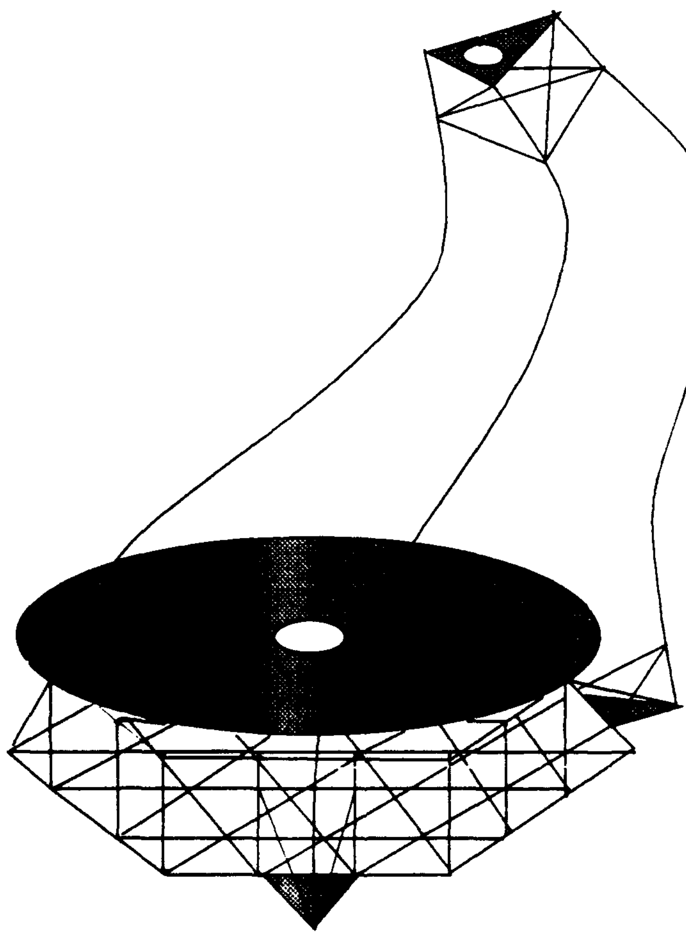

Figure 3.2. Bending Structure Example [16:III-15]

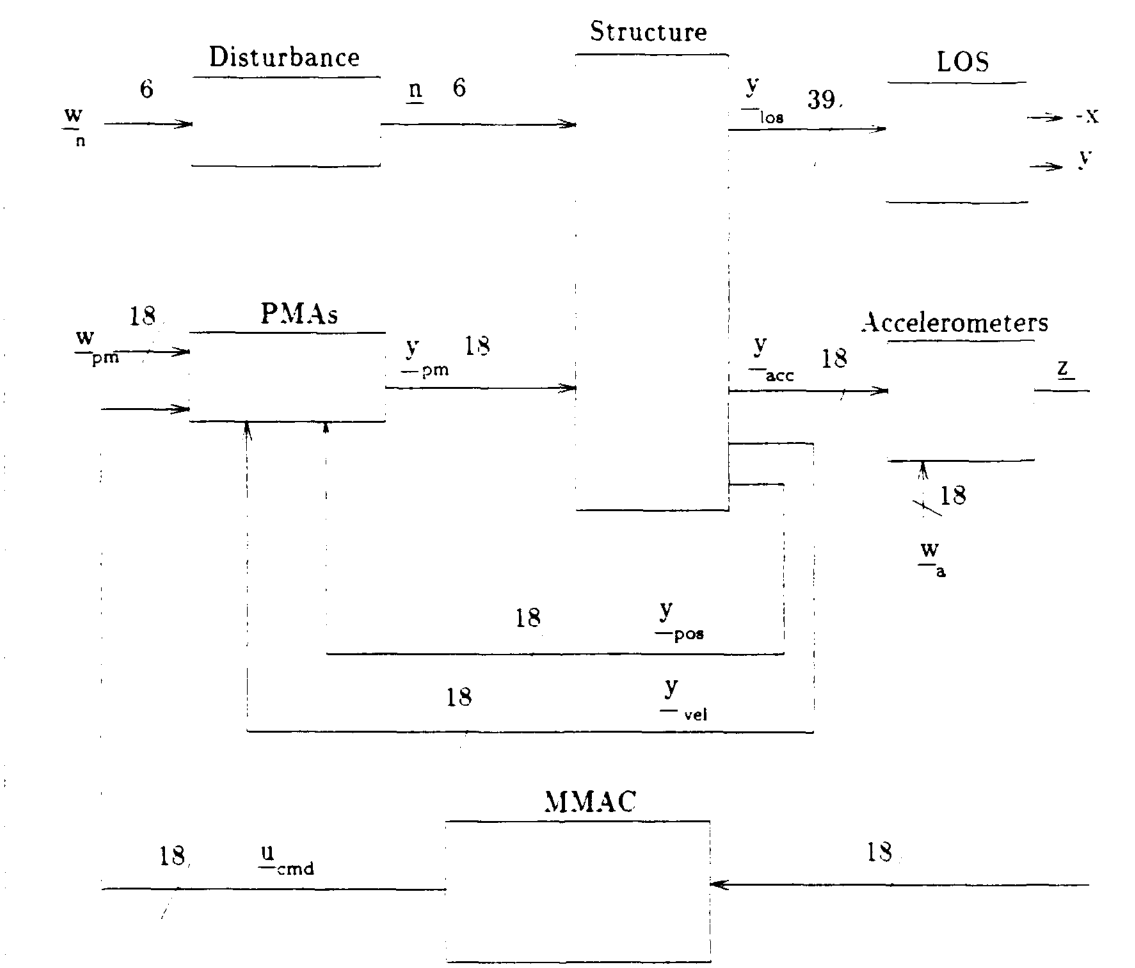

Figure 3.3. SPICE System Block Diagram

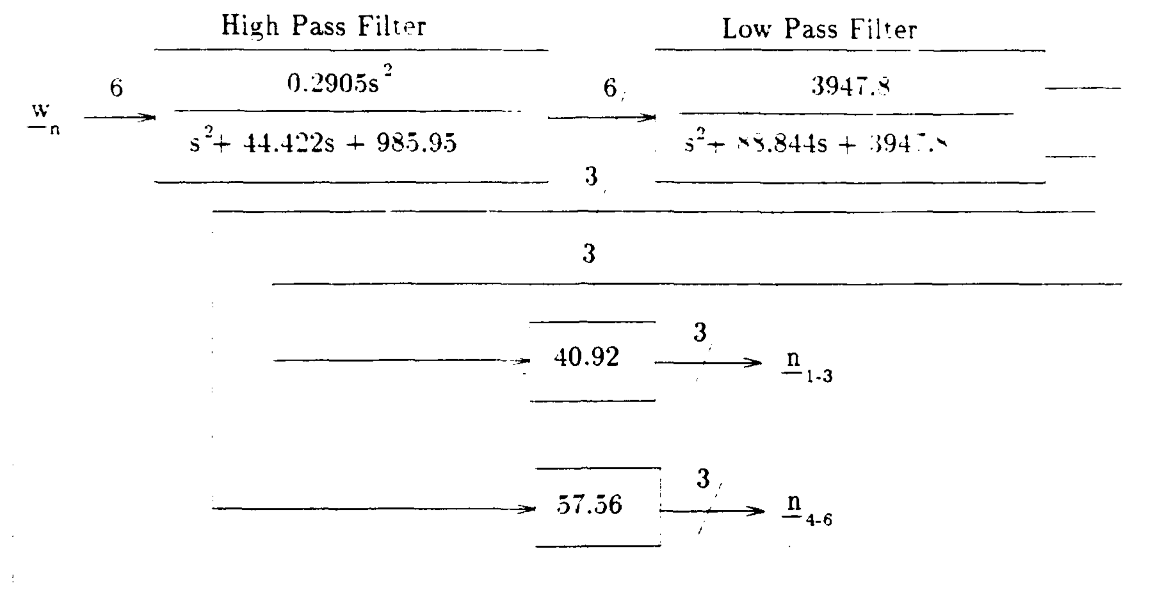

Figure 3.4. Disturbance Model Block Diagram

band. This notch filter is a fourth-order model that shapes six white noise inputs of equivalent strength, as depicted in Figure 3.4. This filter contributes 24 states to the overall system model. There is a gain adjustment performed following the filter process. The general form of the state equation is as follows:

$$\dot{\underline{\mathbf{x}}}_n(t) = \mathbf{F}_n \underline{\mathbf{x}}_n(t) + \mathbf{G}_n \underline{\mathbf{w}}_n(t) \tag{3.1}$$

where

- $\mathbf{x}_n(t)$ is a 24 state vector representing the disturbance states
- $\mathbf{F}_n$ is a 24-by-24 matrix
- $\mathbf{G}_n$ is a 24-by-6 constant matrix
- $\mathbf{w}_n$ is a 6-by-1 white noise vector

and the corresponding output equation is:

$$\underline{\mathbf{n}}(t) = \mathbf{C}_n \underline{\mathbf{x}}_n(t) \tag{3.2}$$

where

- $\mathbf{n}$ is a 6-by-1 output "colored" noise vector
- $\mathbf{C}_n$ is a 6-by-24 constant output matrix

The output vector is defined as:

$$\underline{\mathrm{n}} = \begin{bmatrix} n_1 \\ n_2 \\ n_3 \\ n_4 \\ n_5 \\ n_6 \end{bmatrix} = \begin{bmatrix} \text{SMA x disturbance Leg 1} \\ \text{SMA y disturbance Leg 2} \\ \text{SMA z disturbance Leg 3} \\ \text{Bulkhead z disturbance Leg 1} \\ \text{Bulkhead z disturbance Leg 2} \\ \text{Bulkhead z disturbance Leg 3} \end{bmatrix} \quad (3.3)$$

The disturbances for the SMA represent the motion of cooling fluid in the structure [3]. The disturbance due to the motion of the fluid could have been modeled many different ways. This model, with each axis disturbance entering a separate tripod leg, is the particular model chosen by Phillips Laboratory.

3.3.2 Proof Mass Actuators. Each of the 18 PMAs were initially modeled as depicted in Figure 3.5. This model required four states for the errorless PMA model and four states to model the error for each PMA. This design contributed 144 states to the overall system design. The high number of states for the overall PMA initial design was too large for effective computer simulation. Thus, the initial design was altered to reduce the number of states required to describe the PMAs. Examination of the low pass filters indicated that the PMA was passing frequencies below 6284.9 rad/sec (rps) and the noise was being shaped at frequencies below 2141.66 rps; these low pass frequencies are much larger than 628.32 rps, or 100 Hertz, which is the maximum frequency of interest for this study. Frequencies with a magnitude greater than 628.32 rps are assumed to be "instantaneously" quelled by passive damping designed into the structure. Therefore, the two low-pass filters were eliminated from the design. Bode plots were then constructed for the remaining high-pass filters to see if a further consolidation could be accomplished. Figure 3.6 displays the frequency responses (from the white noise input and command input) for the subsystem shown in Figure 3.5 with the high pass filters removed. It can be seen that the noise and command plots are of identical shape and only vary by a constant. Therefore, the

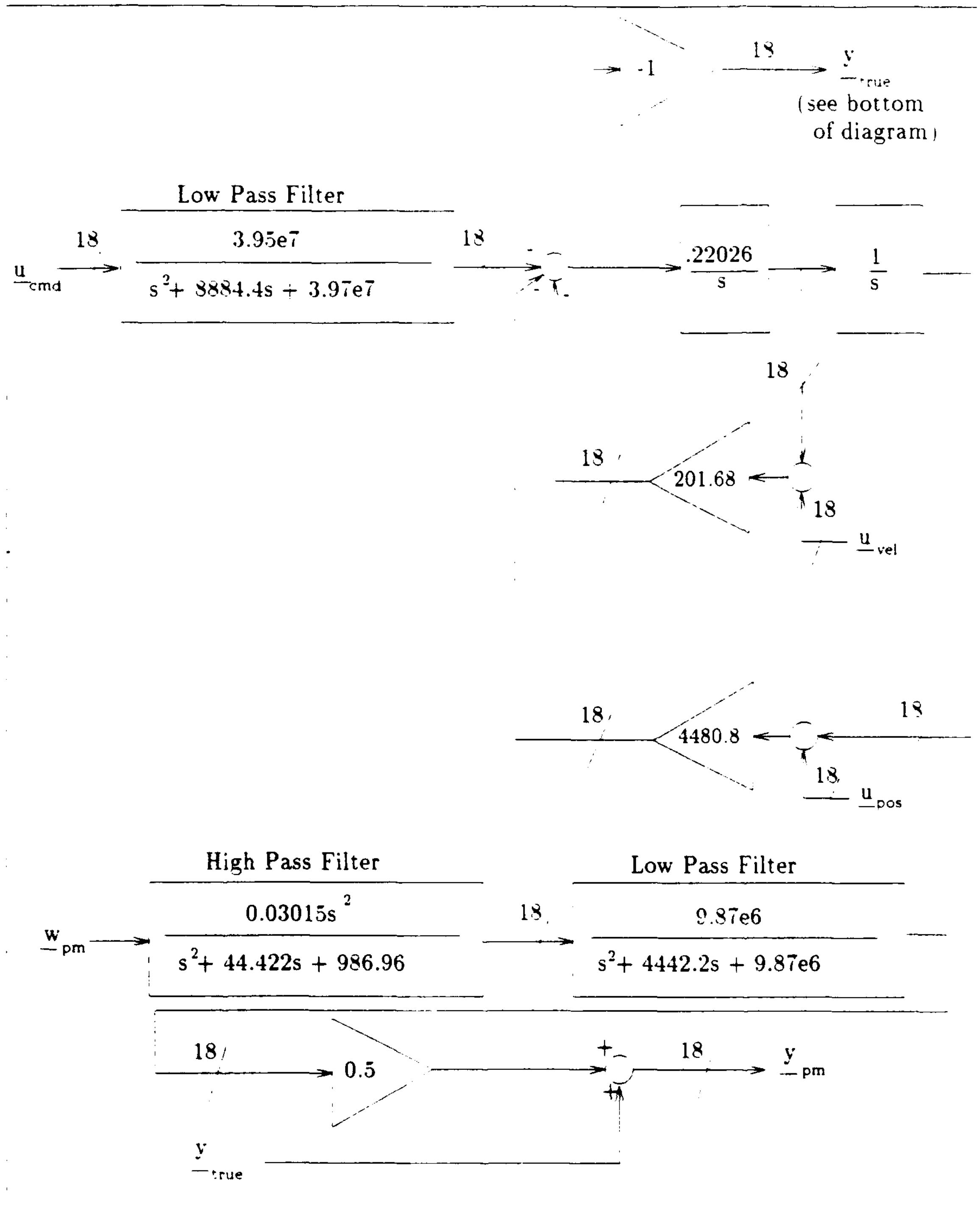

Figure 3.5. Initial PMA design

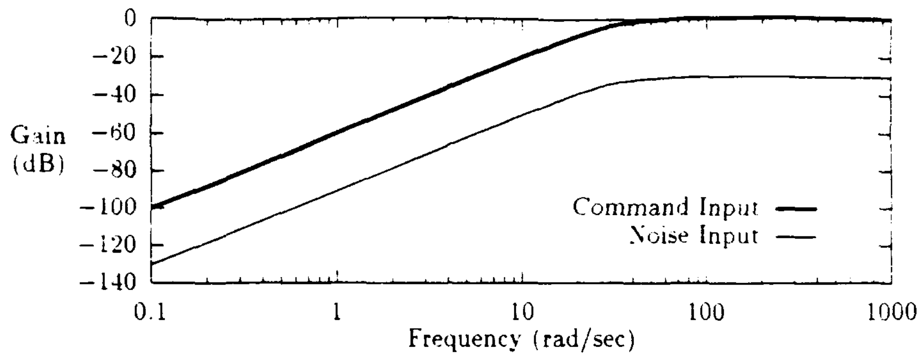

Figure 3.6. Initial PMA Design Frequency Responses

PMA design depicted in Figure 3.7 in which a gain-corrected white noise summed with the command prior to entering the filter was attempted. As shown in the Bode plots of Figure 3.8, the new PMA design, with a gain equal to 0.0156, agrees with the Bode plots of Figure 3.6. Thus, the overall state contribution becomes 36 states: 18 PMAs each requiring a two-state high-pass filter model. The form of the state and output equations are:

$$\dot{\underline{\mathbf{x}}}_{pm}(t) = \mathbf{F}_{pm}\underline{\mathbf{x}}_{pm}(t) + \mathbf{B}_{pm}\underline{\mathbf{u}}_{pm}(t) + \mathbf{G}_{pm}\underline{\mathbf{w}}_{pm}(t) \quad (3.4)$$

where

- $\mathbf{x}_{pm}(t)$ is a 36-state vector representing the PMA filter states
- $\mathbf{F}_{pm}$ is a 36-by-36 matrix
- $\mathbf{B}_{pm}$ is a 36-by-54 constant matrix
- $\mathbf{G}_{pm}$ is a 36-by-18 constant matrix
- $\mathbf{u}_{pm}$ is a 54-dimensional "control" vector made up of components $\mathbf{u}_{cmd}$, $\mathbf{u}_{pos}$ and $\mathbf{u}_{vel}$
- $\mathbf{w}_{pm}$ is an 18-dimensional white noise vector

$$\underline{\mathbf{y}}_{pm}(t) = \mathbf{C}_{pm}\underline{\mathbf{x}}_{pm}(t) + \mathbf{D}_{up}\underline{\mathbf{u}}_{pm}(t) + \mathbf{D}_{wp}\underline{\mathbf{w}}_{pm}(t) \quad (3.5)$$

where

- $\mathbf{y}_{pm}$ is an 18-dimensional PMA output response vector
- $\mathbf{C}_{pm}$ is an 18-by-36 constant output matrix
- $\mathbf{D}_{up}$ is an 18-by-54 constant deterministic input direct feedthrough matrix
- $\mathbf{D}_{wp}$ is an 18-by-18 noise direct feedthrough matrix

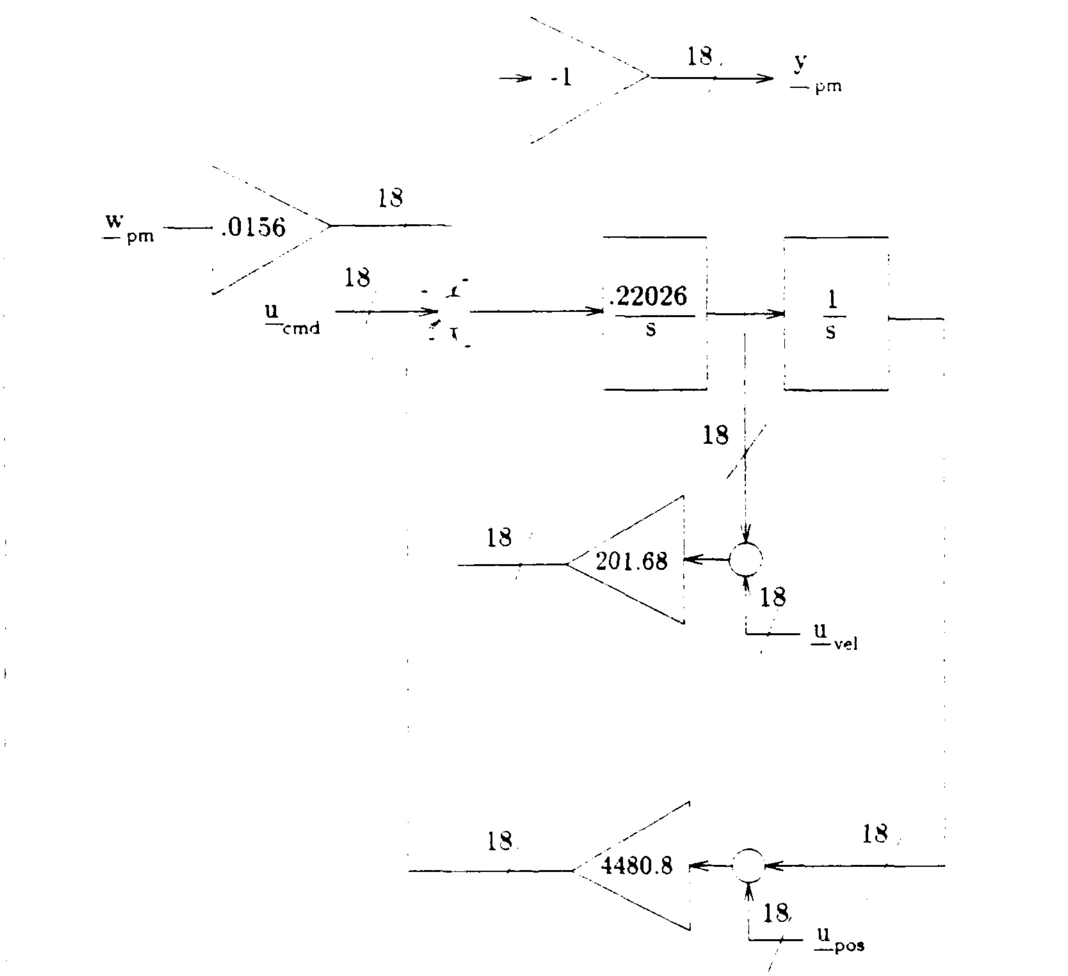

Figure 3.7. New PMA design

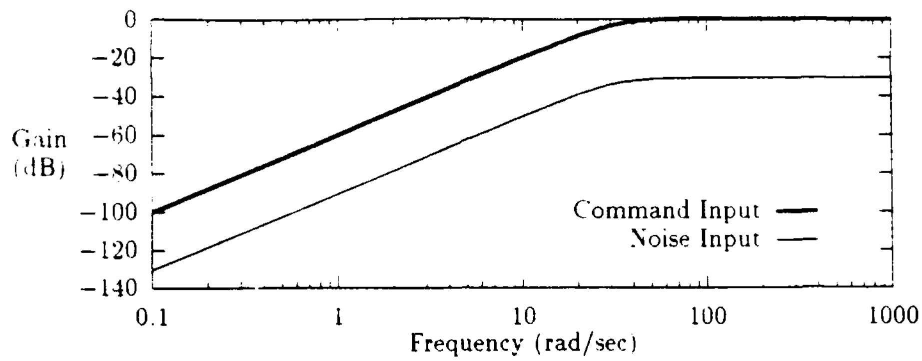

Figure 3.8. Reduced PMA Design Frequency Responses

The direct feedthrough matrices are a result of the filter model transfer function being equal order over equal order.

The input vectors, $\underline{\mathbf{u}}_{pm}$ and $\underline{\mathbf{w}}_{pm}$, are defined as:

$$\underline{\mathbf{u}}_{pm} = \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_{18} \\ u_{19} \\ u_{20} \\ \vdots \\ u_{36} \\ u_{37} \\ u_{38} \\ \vdots \\ u_{54} \end{bmatrix} = \begin{bmatrix} \text{PMA one command, } u_{cmd_1} \\ \text{PMA two command, } u_{cmd_2} \\ \vdots \\ \text{PMA 18 command, } u_{cmd_{18}} \\ \text{Actual PMA 1 velocity, } u_{vel_1} \\ \text{Actual PMA 2 velocity, } u_{vel_2} \\ \vdots \\ \text{Actual PMA 18 velocity, } u_{vel_{18}} \\ \text{Actual PMA 1 position, } u_{pos_1} \\ \text{Actual PMA 2 position, } u_{pos_2} \\ \vdots \\ \text{Actual PMA 18 position, } u_{pos_{18}} \end{bmatrix} \tag{3.6}$$

and

$$\underline{\mathbf{w}}_{pm} = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_{18} \end{bmatrix} = \begin{bmatrix} \text{PMA 1 noise} \\ \text{PMA 2 noise} \\ \vdots \\ \text{PMA 18 noise} \end{bmatrix} \tag{3.7}$$

The output vector, $\underline{\mathbf{y}}_{pm}$, is defined as:

$$\underline{\mathbf{y}}_{pm} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_{18} \end{bmatrix} = \begin{bmatrix} \text{PMA 1 response} \\ \text{PMA 2 response} \\ \vdots \\ \text{PMA 18 response} \end{bmatrix} \tag{3.8}$$

where the actual PMA velocity and position elements of the $\underline{\mathbf{u}}_{pm}$ vector are the relative velocity and position of the mass of the PMA with the point of the structure that the PMA is attached.

3.3.3 Structure. The truth and reduced order models of the structure will be presented later in this chapter. What will now be introduced is the basic form of the state space equation and output equation of the structure.

$$\dot{\underline{\mathbf{x}}}_s(t) = \mathbf{F}_s\underline{\mathbf{x}}_s(t) + \mathbf{B}_s\underline{\mathbf{y}}_{pm}(t) + \mathbf{G}_s\underline{\mathbf{n}}(t) \tag{3.9}$$

where

- $\mathbf{x}_s(t)$ is a 2n-state vector representing the modes of the structure
- $\mathbf{F}_s$ is a 2n-by-2n matrix
- $\mathbf{B}_s$ is a 2n-by-18 constant matrix
- $\mathbf{G}_s$ is a 2n-by-6 constant matrix
- $\mathbf{n}$ is defined in Equation (3.2)
- $\mathbf{y}_{pm}$ is defined in Equation (3.5)
- n is the number of modes representing the structure

The augmented state vector can be defined as:

$$
\underline{\mathbf{x}}_{as} = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \\ x_{n+1} \\ x_{n+2} \\ \vdots \\ x_{2n} \\ x_{2n+1} \\ x_{2n+2} \\ \vdots \\ x_{2n+24} \\ x_{2n+25} \\ x_{2n+26} \\ \vdots \\ x_{2n+60} \end{bmatrix} = \begin{bmatrix} \text{First bending mode velocity} \\ \text{Second bending mode velocity} \\ \vdots \\ \text{nth bending mode velocity} \\ \text{First bending mode position} \\ \text{Second bending mode position} \\ \vdots \\ \text{nth bending mode position} \\ \text{First disturbance state} \\ \text{Second disturbance state} \\ \vdots \\ \text{Twenty-forth disturbance state} \\ \text{First PMA filter state} \\ \text{Second PMA filter state} \\ \vdots \\ \text{Thirty-sixth PMA filter state} \end{bmatrix} \tag{3.10}
$$

The augmented system matrices are written as:

$$
\mathbf{F}_{as} = \begin{bmatrix} \mathbf{F}_{s_{2n\times 2n}} & \mathbf{G}_s\mathbf{H}_{n_{2n\times 24}} & \mathbf{B}_s\mathbf{H}_{p_{2n\times 36}} \\ \mathbf{0}_{24\times 2n} & \mathbf{M}_{n_{24\times 24}} & \mathbf{0}_{24\times 36} \\ \mathbf{0}_{36\times 2n} & \mathbf{0}_{36\times 24} & \mathbf{F}_{pm_{36\times 36}} \end{bmatrix}_{2n+60\times 2n+60} \tag{3.11}
$$

$$
\mathbf{B}_{as} = \begin{bmatrix} \mathbf{B}_s\mathbf{D}_{up_{2n\times 54}} \\ \mathbf{0}_{24\times 54} \\ \mathbf{B}_{pm_{36\times 54}} \end{bmatrix}_{2n+60\times 54} \tag{3.12}
$$

$$\mathbf{G}_{as} = \begin{bmatrix} \mathbf{0}_{2n \times 6} & \mathbf{B}_s \mathbf{D}_{up_{2n \times 18}} \\ \mathbf{G}_{n_{24 \times 6}} & \mathbf{0}_{24 \times 18} \\ \mathbf{0}_{36 \times 6} & \mathbf{G}_{pm_{36 \times 18}} \end{bmatrix}_{2n+60 \times 24} \tag{3.13}$$

The associated output equation is as follows:

$$\underline{\mathbf{y}}_s(t) = \mathbf{C}_s \underline{\mathbf{x}}_s(t) + \mathbf{D}_{sn} \underline{\mathbf{n}}(t) + \mathbf{D}_{sp} \underline{\mathbf{y}}_{pm}(t) \tag{3.14}$$

where

- $\mathbf{y}_s$ is a 93-dimensional PMA output response vector
- $\mathbf{C}_s$ is a 93-by-2n constant output matrix
- $\mathbf{D}_{sn}$ is a 93-by-6 noise direct feedthrough matrix
- $\mathbf{D}_{sp}$ is a 93-by-18 constant deterministic input direct feedthrough matrix

and the corresponding output vector is defined as:

$$
\underline{\mathbf{y}}_s = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_{39} \\ y_{40} \\ y_{41} \\ \vdots \\ y_{57} \\ y_{58} \\ y_{59} \\ \vdots \\ y_{74} \\ y_{75} \\ y_{76} \\ \vdots \\ y_{93} \end{bmatrix} = \begin{bmatrix} \text{LOS optical element 1, } y_{los_1} \\ \text{LOS optical element 2, } y_{los_2} \\ \vdots \\ \text{LOS optical element 39, } y_{los_{39}} \\ \text{Actual PMA one acceleration, } y_{acc_1} \\ \text{Actual PMA two acceleration, } y_{acc_2} \\ \vdots \\ \text{Actual PMA 18 acceleration, } y_{acc_{18}} \\ \text{Actual PMA one velocity, } y_{vel_1} \\ \text{Actual PMA two velocity, } y_{vel_2} \\ \vdots \\ \text{Actual PMA 18 velocity, } y_{vel_{18}} \\ \text{Actual PMA 1 position, } y_{pos_1} \\ \text{Actual PMA 2 position, } y_{pos_2} \\ \vdots \\ \text{Actual PMA 18 response, } y_{pos_{18}} \end{bmatrix} \tag{3.15}
$$

The LOS outputs are obtained from an optical scoring system. This system uses 39 precisely placed laser and sensor pairs to determine a change in position of a laser with respect to the corresponding sensor. Each LOS optical element output, y_{los_1} through $y_{los_{39}}$, reflects alignment change of a particular laser/sensor pair. These outputs are then transformed by a transformation matrix to "X" and "Y" line of sight errors, as depicted in Figure 3.3. The LOS transformation matrix is presented at the end of Appendix A. As stated previously, the position and velocity outputs are the mass of each PMA relative to the PMA's point of connection to the structure. The acceleration outputs of the structure relate the acceleration of the points of interest on the structure which correspond to the accelerometers' and PMAs' "natural" locations (remember PMAs are collocated with the accelerometers) with no disturbances entering the structure. Thus, the motion of the structure relative to each point of interest due to a disturbance input or actuator input can be examined. Substituting Equations (3.2) and (3.5) into Equation (3.14) results in the following augmented

output equation:

$$\mathbf{y}_s = \begin{bmatrix} \mathbf{C}_{s_{93\times 2n}} & \vdots & \mathbf{D}_{sn}\mathbf{H}_{d_{93\times 24}} & \vdots & \mathbf{D}_{sy}\mathbf{H}_{pm_{93\times 36}} \end{bmatrix}_{93\times 2n+60} \underline{\mathbf{x}}_{as} \tag{3.16}$$

$$+\begin{bmatrix} \mathbf{D}_{sy}\mathbf{D}_{up} \end{bmatrix}_{93\times 54} \underline{\mathbf{u}}_{pm} + \begin{bmatrix} \mathbf{D}_{sn}\mathbf{D}_{wp} \end{bmatrix}_{93\times 18} \underline{\mathbf{u}}_{pm} \tag{3.17}$$

$\mathbf{D}_{sy}$ and $\mathbf{D}_{sn}$ appear due to all the structure models implemented in this study being reduced-order models. This will be explained later in the chapter.

3.3.4 Accelerometers. Figure 3.9 displays the original model of the accelerometers. Again, as in the PMA model, the noise model includes a low-pass filter that becomes effective outside the high frequency point of interest. Therefore, the low-pass filter was extracted, resulting in a three-state accelerometer model for each of the 18 inputs. The accelerometer model contributes 54 more states to the system model. The high-pass filter removes low frequencies attributed to rigid body motion. The state space equation describing the accelerometers is given as:

$$\begin{aligned}\dot{\underline{\mathbf{x}}}_{acc}(t) = \begin{bmatrix} \dot{\underline{\mathbf{x}}}_a(t) \\ \dot{\underline{\mathbf{x}}}_{na}(t) \end{bmatrix} &= \begin{bmatrix} \mathbf{F}_a & \mathbf{0} \\ \mathbf{0} & \mathbf{F}_{na} \end{bmatrix} \begin{bmatrix} \underline{\mathbf{x}}_a(t) \\ \underline{\mathbf{x}}_{na}(t) \end{bmatrix} + \begin{bmatrix} \mathbf{B}_a \\ \mathbf{0} \end{bmatrix} \mathbf{y}_{acc}(t) \\ &+ \begin{bmatrix} \mathbf{0} \\ \mathbf{G}_{na} \end{bmatrix} \underline{\mathbf{w}}_a(t)\end{aligned} \tag{3.18}$$

where

- $\mathbf{x}_a(t)$ is an 18-state vector representing the accelerometer response states
- $\mathbf{x}_{na}(t)$ is a 36-state vector representing the time-correlated accelerometer noises
- $\mathbf{F}_a$ is an 18-by-18 constant accelerometer plant matrix
- $\mathbf{F}_{na}$ is an 36-by-36 constant accelerometer noise plant matrix
- $\mathbf{B}_a$ is an 18-by-18 constant matrix
- $\mathbf{G}_{na}$ is a 36-by-18 constant matrix
- $\mathbf{y}_{acc}$ is defined in Equation (3.15)
- $\mathbf{w}_{acc}$ is an 18-dimensional white noise vector

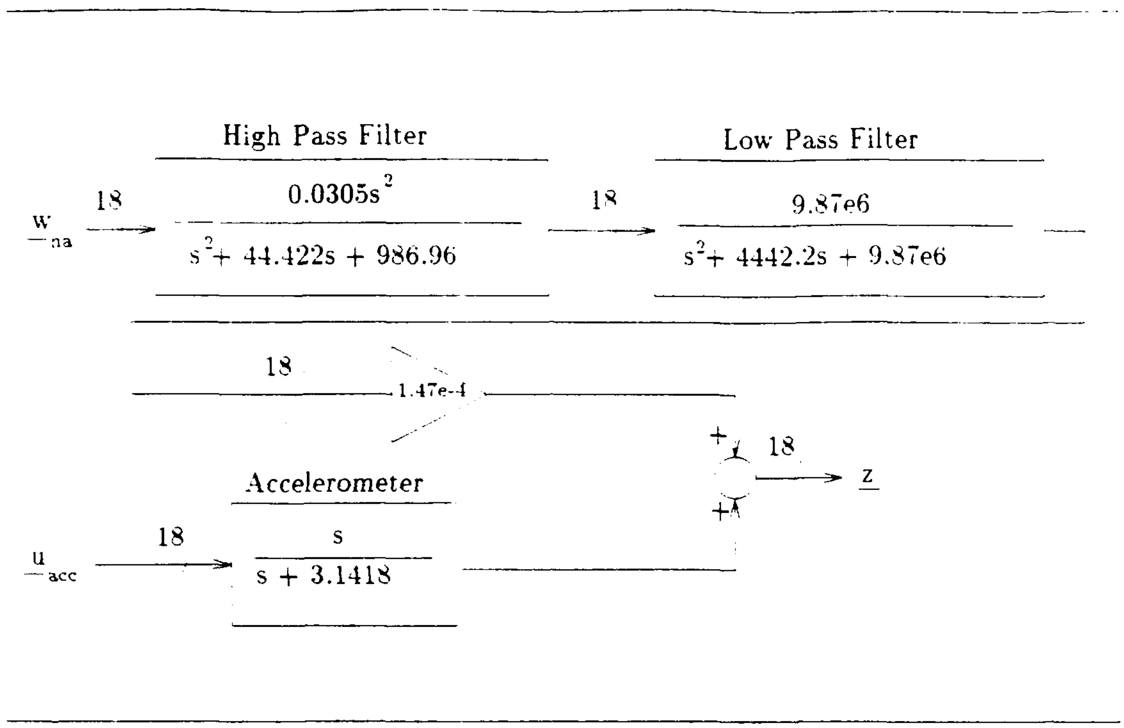

Figure 3.9. Initial Accelerometer Design

The corresponding measurement equation is given as:

$$\underline{\mathbf{z}}(t_i) \quad = \quad \begin{bmatrix} \mathbf{H}_a & \mathbf{H}_{na} \end{bmatrix} \begin{bmatrix} \underline{\mathbf{x}}_a(t_i) \\ \underline{\mathbf{x}}_{na}(t_i) \end{bmatrix} + \begin{bmatrix} \mathbf{D}_{ya} \end{bmatrix} \underline{\mathbf{y}}_{acc}(t_i) + \begin{bmatrix} \mathbf{D}_{wa} \end{bmatrix} \underline{\mathbf{w}}_a(t_i) \qquad (3.19)$$

where

- $\mathbf{x}_a(t)$ is an 18-state vector representing the accelerometer response states
- $\mathbf{x}_{na}(t)$ is a 36-state vector representing the time-correlated accelerometer noises
- $\mathbf{H}_a$ is an 18-by-18 constant accelerometer measurement matrix
- $\mathbf{H}_{na}$ is an 18-by-36 constant accelerometer noise measurement matrix
- $\mathbf{D}_{ya}$ is an 18-by-18 constant matrix
- $\mathbf{D}_{na}$ is an 18-by-18 constant matrix
- $\mathbf{y}_{acc}$ is defined in Equation (3.15)
- $\mathbf{w}_{acc}$ is an 18-dimensional white noise vector

Extracting the appropriate components from Equation (3.17) for $\underline{\mathbf{y}}_{acc}$ (y_{40} through y_{57} of Equation (3.15)) will provide the input vector of the accelerometer section.

The overall state vector dimension of the system truth model is $114+2n$, where n is the number of structure modes being modeled. For the reduced-ordered models, the disturbance and accelerometer shaping filters will be replaced with white noise, resulting in state contributions from these subsystems of zero states for the disturbances model and 18 states for the accelerometers first-order lag response model. Thus, the overall system dimension of the filter models is $54 + 2n$.

Two filter measurement matrices will be implemented in the MMAC design for comparison. The first is the measurement matrix as stated previously, an $\mathbf{H}$ matrix representing only accelerometer measurements (referred to as the original $\mathbf{H}$ matrix). The second measurement matrix (expanded measurement matrix) includes the PMAs' relative velocities and positions as well as the acceleration measurements. An expanded measurement matrix was developed to accomplish such measurement feedback for the full order structure model, the three modal reduced order models and the 12-state internally balanced reduced order model. The form of the expanded $\mathbf{H}$ matrix is as follows:

$$\underline{\mathbf{H}} = \begin{bmatrix} \mathbf{H}_{1-18} \\ \mathbf{H}_{19-36} \\ \mathbf{H}_{37-54} \end{bmatrix} = \begin{bmatrix} \text{System Accelerometers } \mathbf{H}_{acc} \\ \text{Relative PMA Mass Positions } \mathbf{H}_{rel\_pos} \\ \text{Relative PMA Mass Velocities } \mathbf{H}_{rel\_vel} \end{bmatrix} \tag{3.20}$$

Appendix A contains all of the subsystem matrices and their values.

3.4 Mathematical Modeling

Model 2 of the SPICE structure was delivered in the modal coordinate system [16:IV-13]. This is a very desirable form, and this section will illustrate why the modal form is so desirable, by developing a mathematical model of a general structure from the physical form to the modal form. Also discussed are two mathematical methods to reduce the state size of a model.

3.4.1 Physical Coordinate Form. "The standard second order matrix differential equation, developed through finite element methods, which governs the flexural vibrations of a structure" is given by [11:39], [18:3]:

$$\mathbf{M}\ddot{\mathbf{r}}(t) + \mathbf{C}\dot{\mathbf{r}}(t) + \mathbf{K}\mathbf{r}(t) = \mathbf{F}_1(\mathbf{u}, t) + \mathbf{F}_2(t) \tag{3.21}$$

where

- $\mathbf{r}(t)$ = n-dimensional vector representing the structure's physical position
- $\mathbf{F}_1(\mathbf{u}, t)$ = r-dimensional deterministic control inputs
- $\mathbf{F}_2(t)$ = r-dimensional disturbances and unmodeled control inputs
- $\mathbf{M} = n - by - n$ constant mass matrix
- $\mathbf{C} = n - by - n$ constant damping matrix
- $\mathbf{K} = n - by - n$ constant stiffness matrix

Assuming that the external disturbances can be modeled as white Gaussian noises, then the previous equation becomes [11:40], [18:4]:

$$\mathbf{M}\ddot{\underline{\mathbf{r}}}(t) + \mathbf{C}\dot{\underline{\mathbf{r}}}(t) + \mathbf{K}\underline{\mathbf{r}}(t) = -\mathbf{bu}(t) - \mathbf{g}\underline{\mathbf{w}}(t) \tag{3.22}$$

where [14:48]

- $\mathbf{u}(t)$ = r-dimensional vector actuator inputs
- $\mathbf{b} = n - by - r$ control input matrix identifying position and relationships between actuators and controlled variables
- $\underline{\mathbf{w}}(t)$ = s-dimensional vector representing the dynamics driving noise, where s is the number of noise inputs
- $\mathbf{g} = n - by - s$ noise input matrix identifying position and relationships between the dynamics driving noise and

  controlled variables

Equation (3.22) can then be written in the following state space form [11:40], [18:4]:

$$\dot{\underline{\mathbf{x}}}(t) = \mathbf{F}\underline{\mathbf{x}}(t) + \mathbf{Bu}(t) + \mathbf{G}\underline{\mathbf{w}}(t) \tag{3.23}$$

The states of Equation (3.23) are stochastic processes since the states are driven by noise as well as deterministic inputs. For a general structure, a possible state vector representation is:

$$\underline{\mathbf{x}}(t) = \begin{bmatrix} \dot{\underline{\mathbf{r}}}(t) \\ \underline{\mathbf{r}}(t) \end{bmatrix}_{2n \times 1} \tag{3.24}$$

Equation (3.22) describes the same system that Equation (2.1) represents in Section 2.3. The form of the constant system matrices of Equation (3.22) are [11:41]:

$$\mathbf{F} = \begin{bmatrix} -\mathbf{M}^{-1}\mathbf{C}_{n\times n} & -\mathbf{M}^{-1}\mathbf{K}_{n\times n} \\ \mathbf{I}_{n\times n} & \mathbf{0}_{n\times n} \end{bmatrix}_{2n\times 2n} \tag{3.25}$$

$$\mathbf{B} = \begin{bmatrix} -\mathbf{M}^{-1}\mathbf{b}_{n\times r} \\ \mathbf{0}_{n\times r} \end{bmatrix}_{2n\times r} \tag{3.26}$$

$$\mathbf{G} = \begin{bmatrix} -\mathbf{M}^{-1}\mathbf{g}_{n\times s} \\ \mathbf{0}_{n\times s} \end{bmatrix}_{2n\times s} \tag{3.27}$$

Recall for the SPICE system that the two measurement matrices to be examined are concerned with acceleration and relative positions and velocities. For the purpose of explaining the physical modeling of just the velocity and position measurements, the discrete-time measurement model for the state vector of Equation (3.24) is given by:

$$\underline{\mathbf{z}}(t_i) = \left\{ \begin{bmatrix} \mathbf{H}_{\mathbf{v}} & \mathbf{0} \\ \mathbf{0} & \mathbf{H}_{\mathbf{p}} \end{bmatrix}_{m\times 2n} \underline{\mathbf{x}}(t_i) \right\} + \underline{\mathbf{v}}(t_i) \tag{3.28}$$

where:

- m = number of measurements
- $\underline{\mathbf{v}}(t_i)$ = m-dimensional uncertain measurement disturbance modeled as a zero-mean white Gaussian noise of covariance $\mathbf{R}(t_i)$
- $\mathbf{H}_{\mathbf{p}} = (m/2) - by - n$ position measurement matrix in physical coordinates
- $\mathbf{H}_{\mathbf{v}} = (m/2) - by - n$ velocity measurement matrix in physical coordinates

Note that an equal number of position and measurements are assumed: this can be generalized easily. The measurement matrix may differ vastly from the one presented in Equation (3.28), depending on the measurements available. This does

not affect the general structure of the plant matrix or the input matrices (Equations (3.25) through (3.27)).

The equations in the physical coordinate form are highly coupled. This makes it difficult to determine important characteristics of the structure. Thus, a coordinate transformation to the modal coordinate system is justified. In modal coordinate form, the equations are independent and structural characteristics are attained in a simpler fashion.

3.4.2 Modal Coordinate Form. For constant matrices, modal decomposition is very useful, but all of the useful benefits wouldn't exist if the matrices were variable [2:262]. Following research performed by Lynch and Banda, the damping matrix is assumed to be a linear combination of the mass and stiffness matrices [18:4]:

$$\mathbf{C} = \alpha\mathbf{M} + \beta\mathbf{K} \tag{3.29}$$

By transforming from the physical to the modal coordinate system, the actual determination of α and β are not necessary. Denoting the modal coordinates by $\check{\mathbf{r}}$, the correlation between the modal and physical forms is given by [18:5]:

$$\mathbf{r} = \mathcal{T}\check{\mathbf{r}} \tag{3.30}$$

where $\mathcal{T}$ is a $n - by - n$ transformation matrix fashioned from the eigenvectors of the solution in [18:5]:

$$\omega^2\mathbf{M}\mathcal{T} = \mathbf{K}\mathcal{T} \tag{3.31}$$

Note in the previous equation that the damping matrix is not required to determine the eigenvectors. Thus, not needing the damping matrix for modal decomposition is the reason that the α and β of Equation (3.29) are not determined. The values of ω that satisfy Equation (3.31) are called the natural or modal frequencies.

Implementing the transformation illustrated in Equation (3.30) with Equation (3.23) results in the following transformed state space equation [18:5]:

$$\dot{\underline{\mathbf{x}}}(t) = \check{\mathbf{F}}\underline{\mathbf{x}}(t) + \check{\mathbf{B}}\mathbf{u}(t) + \check{\mathbf{G}}\underline{\mathbf{w}}(t) \tag{3.32}$$

The transformed state vector is defined as [18:5]:

$$\underline{\check{\mathbf{x}}}(t) = \begin{bmatrix} \underline{\dot{\mathbf{r}}}(t) \\ \underline{\check{\mathbf{r}}}(t) \end{bmatrix}_{2n\times 1} \tag{3.33}$$

The transformed matrices of Equation (3.23) are calculated as [18:5]:

$$\check{\mathbf{F}} = \begin{bmatrix} -\mathcal{T}^{-1}\mathbf{M}^{-1}\mathbf{C}\mathcal{T} & -\mathcal{T}^{-1}\mathbf{M}^{-1}\mathbf{K}\mathcal{T} \\ \mathbf{I} & \mathbf{0} \end{bmatrix}_{2n\times 2n} \tag{3.34}$$

$$\check{\mathbf{B}} = \begin{bmatrix} -\mathcal{T}^{-1}\mathbf{M}^{-1}\mathbf{b} \\ \mathbf{0} \end{bmatrix}_{2n\times r} = \check{\mathbf{G}} \tag{3.35}$$

For simplicity, this general structural model assumes that the white noise enters the structure at the same location as the deterministic inputs.

The modal form provides independent equations, thus the modal vectors are orthogonal. This othogonality along with the following equation:

$$\left[-\mathcal{T}^{-1}\mathbf{M}^{-1}\mathbf{C}\mathcal{T}\right] = -2\zeta_i\omega_i \tag{3.36}$$

permits the plant matrix to be written in terms of the undamped natural frequency and the damping ratio of the i-th mode. Thus, $\check{\mathbf{F}}$ may be written as:

$$\check{\mathbf{F}} = \begin{bmatrix} [-2\zeta_i\omega_i] & [-\omega_i^2] \\ \mathbf{I} & \mathbf{0} \end{bmatrix}_{2n\times 2n} \tag{3.37}$$

where each of the four entries represents a diagonal $n \times n$ quadrant. The measurement process equation may be written as:

$$\underline{\mathbf{z}}(t_i) = \begin{bmatrix} \mathbf{H}_\mathbf{v}\mathcal{T} & \mathbf{0} \\ \mathbf{0} & \mathbf{H}_\mathbf{p}\mathcal{T} \end{bmatrix}_{m\times 2n} \underline{\check{\mathbf{x}}}(t_i) + \underline{\mathbf{v}}(t_i) \tag{3.38}$$

As stated previously, the form of the measurement matrix $\hat{\mathbf{H}}$, in Equation (3.38) may vary due to the measurements available, but the general form of the plant matrix and input matrices will be maintained.

From the development of the physical and modal mathematical models, it can be seen that the modal form offers insights to the structure that are more readily available then the physical form, i.e. direct relationships of natural frequency and the damping ratio to the mass and stiffness of the structure is visible and the access to the natural frequency matrix and damping ratio matrix is much simpler. These models developed directly from the actual physical structure can have a large state dimension that is computationally very burdensome (particularly for online filter/controller use), so a process to reduce the size of these models is necessary. Two different processes will be discussed in the following sections.

3.4.3 Modal Reduction Technique. This method eliminates high frequency modes from the model. This section describes the technique to accomplish the high frequency mode elimination.

The continuous, linear, stochastic system model given in Equation (3.23) is partitioned as [11:52], [13:123]:

$$\dot{\underline{\mathbf{x}}}(t) = \begin{bmatrix} \dot{\underline{\mathbf{x}}}_1(t) \\ \dot{\underline{\mathbf{x}}}_2(t) \end{bmatrix} = \begin{bmatrix} \mathbf{F}_{11} & \mathbf{F}_{12} \\ \mathbf{F}_{21} & \mathbf{F}_{22} \end{bmatrix} \begin{bmatrix} \underline{\mathbf{x}}_1(t) \\ \underline{\mathbf{x}}_2(t) \end{bmatrix} + \begin{bmatrix} \mathbf{B}_1 \\ \mathbf{B}_2 \end{bmatrix} \mathbf{u}(t) + \begin{bmatrix} \mathbf{G}_1 \\ \mathbf{G}_2 \end{bmatrix} \underline{\mathbf{w}}(t) \tag{3.39}$$

where the system is driven by deterministic controls $\mathbf{u}(t)$ and zero-mean, white Gaussian noise $\mathbf{w}(t)$ of strength $\mathbf{Q}(t)$. The partition corresponding to the $\underline{\mathbf{x}}_1(t)$ state vector represents the lower frequency modes which are to be kept in the design model. The $\underline{\mathbf{x}}_2(t)$ state vector partition corresponds to the higher frequency modes desired to be removed from the design model.

Assuming that steady state is reached essentially instantaneously by the higher frequency modes ($\dot{\underline{\mathbf{x}}}_2(t) = \mathbf{0}$ for the continuous-time case), the $\underline{\mathbf{x}}_2(t)$ modes can be removed while keeping the lower frequency $\underline{\mathbf{x}}_1(t)$ modes. Then $\underline{\mathbf{x}}_2(t)$ can be written in terms of $\underline{\mathbf{x}}_1(t)$ and system inputs, since both $\mathbf{F}_{11}$ and $\mathbf{F}_{22}$ are square matrices and

since, by assumption, $\mathbf{F}_{22}^{-1}$ exists. Thus, the higher order modes are now depicted in continuous space as [11:52], [13:123]:

$$\dot{\underline{\mathbf{x}}}_2(t) = \mathbf{F}_{21}\underline{\mathbf{x}}_1(t) - \mathbf{F}_{22}\underline{\mathbf{x}}_2(t) + \mathbf{B}_2\mathbf{u}(t) + \mathbf{G}_2\underline{\mathbf{w}}(t) = \mathbf{0} \tag{3.40}$$

$$\underline{\mathbf{x}}_2(t) = -\mathbf{F}_{22}^{-1}\left[\mathbf{F}_{21}\underline{\mathbf{x}}_1(t) + \mathbf{B}_2\mathbf{u}(t) + \mathbf{G}_2\underline{\mathbf{w}}(t)\right] \tag{3.41}$$

Substituting Equations (3.40) and (3.41) into Equation (3.39) results in [11:52], [13:123]:

$$\begin{aligned}\dot{\underline{\mathbf{x}}}_1(t) &= \left[\mathbf{F}_{11} - \mathbf{F}_{12}\mathbf{F}_{22}^{-1}\mathbf{F}_{21}\right]\underline{\mathbf{x}}_1(t) + \left[\mathbf{B}_1 - \mathbf{F}_{12}\mathbf{F}_{22}^{-1}\mathbf{B}_2\right]\mathbf{u}(t) \\ &\quad + \left[\mathbf{G}_1 - \mathbf{F}_{12}\mathbf{F}_{22}^{-1}\mathbf{G}_2\right]\underline{\mathbf{w}}(t)\end{aligned} \tag{3.42}$$

The analogous development for the discrete-time case is given by the following presentation [25]. The equivalent discrete-time model of Equation (3.39) is as follows:

$$\begin{aligned}\underline{\mathbf{x}}(t_{i+1}) &= \begin{bmatrix}\underline{\mathbf{x}}_1(t_{i+1}) \\ \underline{\mathbf{x}}_2(t_{i+1})\end{bmatrix} = \begin{bmatrix}\mathbf{\Phi}_{11} & \mathbf{\Phi}_{12} \\ \mathbf{\Phi}_{21} & \mathbf{\Phi}_{22}\end{bmatrix}\begin{bmatrix}\underline{\mathbf{x}}_1(t_i) \\ \underline{\mathbf{x}}_2(t_i)\end{bmatrix} + \begin{bmatrix}\mathbf{B}_{d_1} \\ \mathbf{B}_{d_2}\end{bmatrix}\mathbf{u}(t_i) \\ &\quad + \begin{bmatrix}\mathbf{G}_{d_1} \\ \mathbf{G}_{d_2}\end{bmatrix}\underline{\mathbf{w}_\mathbf{d}}(t_i)\end{aligned} \tag{3.43}$$

For the steady-state assumption made earlier, ($\dot{\underline{\mathbf{x}}}_2(t) = \mathbf{0}$ for the continuous-time case), applied to the discrete-time case, $\underline{\mathbf{x}}_2(t_{i+1}) = \underline{\mathbf{x}}_2(t_i)$, results in the following representation of the higher-order modes:

$$\mathbf{\Phi}_{21}\underline{\mathbf{x}}_1(t_i) + \left[\mathbf{\Phi}_{22} - \mathbf{I}\right]\underline{\mathbf{x}}_2(t_i) + \mathbf{B}_{d_2}\mathbf{u}(t_i) + \mathbf{G}_{d_2}\underline{\mathbf{w}}_d(t_i) = \mathbf{0} \tag{3.44}$$

$$\underline{\mathbf{x}}_2(t_i) = -\left[\mathbf{\Phi}_{22} - \mathbf{I}\right]^{-1}\left[\mathbf{\Phi}_{21}\underline{\mathbf{x}}_1(t_i) + \mathbf{B}_{\mathbf{d_2}}\mathbf{u}(t_i) + \mathbf{G}_{d_2}\underline{\mathbf{w}}_d(t_i)\right] \tag{3.45}$$

The first-order approximation of the discretization of the continuous state-space equation is as follows:

$$\mathbf{\Phi}_{22} = \mathbf{I} + \mathbf{F}_{22}\Delta t \tag{3.46}$$

$$\mathbf{\Phi}_{21} = \mathbf{F}_{21}\Delta t \tag{3.47}$$

$$\mathbf{B}_{d_2} = \mathbf{F}_2 \Delta t \tag{3.48}$$

$$\mathbf{G}_{d_2} = \mathbf{G}_2 \Delta t \tag{3.49}$$

$$\mathbf{Q}_d = \mathbf{Q} / \Delta t \tag{3.50}$$

Since, to first order, $\mathbf{G}_{d_2}\mathbf{Q}_d\mathbf{G}_{d_2}^T \cong \mathbf{G}_2\mathbf{Q}_2\mathbf{G}_2^T\Delta t$ and $\mathbf{G}_{d_2} = \mathbf{G}_2\Delta t$, $\mathbf{Q}_d$ must be given as in Equation (3.50).

Substituting the first-order approximation into Equation (3.45) results in the following equation:

$$\underline{\mathbf{x}}_2(t_i) = -\left[\mathbf{F}_{22}\Delta t\right]^{-1}\left[\mathbf{F}_{21}\Delta t\underline{\mathbf{x}}_1(t) + \mathbf{B}_2\Delta t\mathbf{u}(t) + \mathbf{G}_2\Delta t\underline{\mathbf{w}}_d(t)\right] \tag{3.51}$$

where $\underline{\mathbf{w}}_d(t)$ has the covariance of $\mathbf{Q}_d = \mathbf{Q}_2/\Delta t$. Dividing through by Δt both inside and outside the inverse, i.e., multiplying Equation (3.51) by one, yields

$$\underline{\mathbf{x}}_2(t) = -\mathbf{F}_{22}^{-1}\left[\mathbf{F}_{21}\underline{\mathbf{x}}_1(t) + \mathbf{B}_2\mathbf{u}(t) + \mathbf{G}_2\underline{\mathbf{w}}_d(t)\right] \tag{3.52}$$

This is the same result as Equation (3.52) for the continuous-time case, except that $\underline{\mathbf{w}}$ is replaced with $\underline{\mathbf{w}}_d$, a *discrete-time* white Gaussian noise with covariance given by Equation (3.50). Substituting Equation (3.52) into the measurement equation:

$$\underline{\mathbf{z}}(t_i) = \begin{bmatrix} \mathbf{H}_1 & \mathbf{H}_2 \end{bmatrix} \begin{bmatrix} \underline{\mathbf{x}}_1(t_i) \\ \underline{\mathbf{x}}_2(t_i) \end{bmatrix} + \underline{\mathbf{v}}(t_i) \tag{3.53}$$

yields the result:

$$\begin{aligned}\underline{\mathbf{z}}(t_i) = {} & \left[\mathbf{H}_1 - \mathbf{H}_2\mathbf{F}_{22}^{-1}\mathbf{F}_{21}\right]\underline{\mathbf{x}}_1(t_i) - \mathbf{H}_2\mathbf{F}_{22}^{-1}\left[\mathbf{B}_2\mathbf{u}(t_i) + \mathbf{G}_2\underline{\mathbf{w}}_d(t_i)\right] \\ & + \underline{\mathbf{v}}(t_i)\end{aligned} \tag{3.54}$$

The second term in Equation (3.54) is a direct feedthrough term created by the order reduction [11:52], [13:123], as anticipated in Section 3.3.3.

Determining the break between higher and lower frequencies is accomplished by examining an ordered list of the modal frequencies to observe the natural breaks

that occur in the modes. The modes corresponding to the appropriate low frequency clusters of ω_i are then used to form the reduced-order models.

This technique could be applied directly to the modal coordinate system representation of the truth model (given in Equations (3.32) through (3.38)). The new system dynamics matrix is as follows [11:53], [13:123]:

$$\check{\mathbf{F}} = \begin{bmatrix} [-2\zeta_1\omega_1] & [-\omega_1^2] & \vdots & \mathbf{0} & \mathbf{0} \\ \mathbf{I} & \mathbf{0} & \vdots & \mathbf{0} & \mathbf{0} \\ \cdots\cdots & \cdots\cdots & \cdots\cdots & \cdots\cdots & \cdots\cdots \\ \mathbf{0} & \mathbf{0} & \vdots & [-2\zeta_2\omega_2] & [-\omega_2^2] \\ \mathbf{0} & \mathbf{0} & \vdots & \mathbf{I} & \mathbf{0} \end{bmatrix} \tag{3.55}$$

The upper left quadrant represents the low frequency modes which are to be maintained and the lower right quadrant depicts the higher frequency modes assumed to reach steady state instantaneously. These two quadrants correspond to the $\mathbf{F}_{11}$ and $\mathbf{F}_{22}$ partitions of Equation (3.39). The quadrants $\mathbf{F}_{12}$ and $\mathbf{F}_{21}$ are zero. Inputting this information into Equations (3.42) and (3.54) yields [11:53], [13:123]:

$$\dot{\check{\underline{\mathbf{x}}}}_1(t) = \check{\mathbf{F}}_{11}\check{\underline{\mathbf{x}}}_1(t) + \check{\mathbf{B}}_1\mathbf{u}(t) + \check{\mathbf{G}}_1\underline{\mathbf{w}}_r(t) = \check{\mathbf{F}}_r\check{\underline{\mathbf{x}}}_1(t) + \check{\mathbf{B}}_r\mathbf{u}(t) + \check{\mathbf{G}}_r\underline{\mathbf{w}}_r(t) \tag{3.56}$$

$$\begin{aligned} \underline{\mathbf{z}}(t_i) &= \check{\mathbf{H}}_1\check{\underline{\mathbf{x}}}_1(t_i) - \check{\mathbf{H}}_2\check{\mathbf{F}}_{22}^{-1}\check{\mathbf{B}}_2\mathbf{u}(t_i) - \check{\mathbf{H}}_2\check{\mathbf{F}}_{22}^{-1}\check{\mathbf{G}}_2\underline{\mathbf{w}}_d(t_i) + \underline{\mathbf{v}}_r(t_i) \\ &= \check{\mathbf{H}}_r\check{\underline{\mathbf{x}}}_1(t_i) + \check{\mathbf{D}}_u\mathbf{u}(t_i) + \check{\mathbf{D}}_w\underline{\mathbf{w}}_d(t_i) + \underline{\mathbf{v}}_r(t_i) \end{aligned} \tag{3.57}$$

where the subscript r denotes "reduced-order." Examining Equation (3.57), it can be seen that the direct feedthrough terms $\check{\mathbf{D}}_u$ and $\check{\mathbf{D}}_w$ are the only terms associated with the high frequency modes. Direct measurement of the effects of the control inputs $\mathbf{u}(t_i)$ and the system dynamics driving noise $\underline{\mathbf{w}}_d(t)$ is possible from the direct feedthrough terms.

3.4.4 Internally Balanced Reduction Technique [5:31-35]. The internally balanced reduction technique differs from the modal reduction method in that there is

no assumption made regarding the higher frequency modes reaching steady state essentially instantaneously. Instead, the internal balancing technique applies the contributions from the complete frequency bandwidth of interest to the reduced order model, or said another way, internal balancing distributes the error of the reduction over the entire bandwidth of interest.

The input-output of a transfer function is not altered by a similarity transformation, but what does change is the controllability gramian, $\mathbf{W}_c(s)$, and observability gramian, $\mathbf{W}_o(s)$. These gramians are obtained from the following equations:

$$\mathbf{F}\mathbf{W}_c + \mathbf{W}_c\mathbf{F}^T + \mathbf{B}\mathbf{B}^T = \mathbf{0} \tag{3.58}$$

$$\mathbf{F}^T\mathbf{W}_o + \mathbf{W}_o\mathbf{F} + \mathbf{H}\mathbf{H}^T = \mathbf{0} \tag{3.59}$$

It is desired that gramians, $\mathbf{W}_c$ and $\mathbf{W}_o$, be equal and thus that the model be "internally balanced". Therefore, one seeks the system model matrices $\check{\mathbf{F}}$, $\check{\mathbf{B}}$, and $\check{\mathbf{H}}$ such that Equations (3.58) and (3.59) are satisfied and such that $\check{\mathbf{W}}_c = \check{\mathbf{W}}_o$. The form of the gramian matrix that provides a reduction in computational burden is a diagonal matrix. Thus, once the gramians have been computed, it is necessary to determine the similarity transformation, $\mathcal{T}_b$ that will transform the gramians to diagonal form.

The first step is to compute the Cholesky square roots of $\mathbf{W}_c$ and $\mathbf{W}_o$:

$$\mathbf{W}_c = \mathbf{S}_c\mathbf{S}_c^T \tag{3.60}$$

$$\mathbf{W}_0 = \mathbf{S}_o\mathbf{S}_o^T \tag{3.61}$$

Next compute the singular value decomposition of $\mathbf{S}_o^T\mathbf{S}_c$:

$$\mathbf{S}_o^T\mathbf{S}_c = \mathbf{U}\boldsymbol{\Delta}\mathbf{V}^T \tag{3.62}$$

where $\mathbf{U}^T\mathbf{U} = \mathbf{V}^T\mathbf{V} = \mathbf{I}$ and $\boldsymbol{\Delta}$ is a diagonal matrix, referred to as the balanced gramian.

Now the desired similarity transform can be formed.

$$\mathcal{T}_b = \mathbf{S}_c\mathbf{V}\boldsymbol{\Delta}^{-1/2} \tag{3.63}$$

$$\mathcal{T}_b^{-1} = \mathbf{\Delta}^{-1/2}\mathbf{U}^T\mathbf{S}_c^T \tag{3.64}$$

Finally, the balanced system matrices can be formed:

$$\check{\mathbf{F}} = \mathcal{T}_b^{-1}\mathbf{F}\mathcal{T}_b \tag{3.65}$$

$$\check{\mathbf{B}} = \mathcal{T}_b^{-1}\mathbf{B} \tag{3.66}$$

$$\check{\mathbf{H}} = \mathbf{H}\mathcal{T}_b \tag{3.67}$$

$$\check{\mathbf{D}} = \mathbf{D} \tag{3.68}$$

and the diagonal gramian matrices can be formed:

$$\check{\mathbf{W}}_c = \mathcal{T}_b^{-1}\mathbf{W}_c\mathcal{T}_b^{-T} \tag{3.69}$$

$$\check{\mathbf{W}}_o = \mathcal{T}_b^T\mathbf{W}_o\mathcal{T}_b \tag{3.70}$$

where $\check{\mathbf{W}}_c = \check{\mathbf{W}}_o = \mathbf{\Delta}$

Also, the balanced state vector can be computed:

$$\check{\mathbf{x}} = \mathcal{T}_b^{-1}\mathbf{x} \tag{3.71}$$

Reduction is completed by examining the balanced gramian to determine which first m states are to be retained. The diagonal terms (eigenvalues) of the balanced gramian form natural groupings and natural breaks from which the largest m eigenvalues are retained. Then the upper left $m \times m$ partition of the $\check{\mathbf{F}}$ matrix is extracted along with the corresponding portions of the $\check{\mathbf{B}}$, $\check{\mathbf{G}}$ and $\check{\mathbf{H}}$. The reduced internally balanced state vector becomes the first m states of the full internally balanced state vector. The resulting system equation is:

$$\dot{\underline{\check{\mathbf{x}}}}_r(t) = \check{\mathbf{F}}_r\underline{\check{\mathbf{x}}}_r(t) + \check{\mathbf{B}}_r\mathbf{u}(t) + \check{\mathbf{G}}_r\underline{\mathbf{w}}(t) \tag{3.72}$$

where the subscript r represents reduced order. The measurement equation is:

$$\underline{\mathbf{z}}_r(t_i) = \check{\mathbf{H}}_r\underline{\check{\mathbf{x}}}_r(t_i) + \underline{\mathbf{v}}_r(t_i) + \check{\mathbf{D}}_{r_u}\mathbf{u}(t_i) + \check{\mathbf{D}}_{r_w}\underline{\mathbf{w}}_d(t_i) \tag{3.73}$$

where $\underline{\mathbf{v}}_r(t_i)$ represents the uncertainty introduced by the truncation, and $\breve{\mathbf{D}}$ is due to the reduction process and can be determined in a similar manner as in Section 3.4.3.

3.4.5 SPICE Mathematical Model. The mathematical model of the SPICE structure, as stated previously, received from the sponsor was already in modal coordinate form. Three models of different dimensions were received. A 93-mode model (186 states) is the largest and the natural frequency range covered by this model is 48.6 rps to 1146.1 rps. The second model consists of 56-modes (112 states) and the range of ω_i being 48.6 rps to 622.3 rps. The last model ranges from 48.6 rps to 453.1 rps.

3.5 Truth Model Selection.

The structural truth model was attained from the mathematical representation of the SPICE structure received from Kirtland AFB.

Examination of the three different mathematical models delivered, indicated that the two smaller models were constructed by implementing modal reduction on the 93-mode model. The decision was made to declare one of the three models received as the truth model for this study.

In determining a truth model representation, it is important to retain the frequency range of the model where the dominant bending modes of the structure exist. Also, the state dimensionality is critical in the minimization of computational loading. Recalling that the frequency range of significance for this structure is 0 to 628 rps, i.e., 0 to 100 Hertz, indicates that the 56-mode model would be ideal. This model represents a 112-state structure truth model, which alone would be a computational burden. Due to computer simulation of the disturbances, PMAs, and accelerometers, modelling the entire system adds 114 more states to the truth model. Thus, the system truth model size using the 56-mode structure model would be 226 states, a considerable computational burden. Selecting the 40-mode model reduces the number of structure truth model states by 32 and therefore the overall system states to 194, while retaining the dominant frequencies.

The truth model state vector is composed of the first 40 bending mode velocity states, followed by the corresponding 40 bending mode position states:

$$\underline{\check{\mathbf{x}}}_t = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_{40} \\ x_{41} \\ x_{42} \\ \vdots \\ x_{80} \end{bmatrix} = \begin{bmatrix} \text{First bending mode velocity} \\ \text{Second bending mode velocity} \\ \vdots \\ \text{Fortieth bending mode velocity} \\ \text{First bending mode position} \\ \text{Second bending mode position} \\ \vdots \\ \text{Fortieth bending mode position} \end{bmatrix} \tag{3.74}$$

Equations (3.34) and (3.35) describe the form of the system matrices. The contents of the matrices for the truth model are found in Appendix B.

3.6 Order Reduction Selection

The two methods of order reduction discussed in Sections 3.4.3 and 3.4.4 were employed in the development and selection of the reduced-order SPICE structure models upon which to design the filters and controllers of this research. The purpose of this is to reduce the computational burden further and determine which technique of order reduction is the most effective for this type of problem.

*3.6.1 **Modal Reduction.*** Table 3.1 contains the first 15 modes of the 40-mode truth model. Examining the table, natural groupings of eigenvalues are observed. The natural groupings are ideal locations to perform the modal reduction process. Two reduced-order models were developed: one model containing the first three modes and the second model consisting of the first six modes. These two models will be compared with equivalent internally balanced reduced models. The system matrices for these two models are shown in Appendix B.

Bode amplitude ratio plots corresponding to the open-loop system in Figure 3.10 were produced for each of the 24 inputs, observed at the two LOS outputs. The structure models examined were the truth model and the two modal reduced models. These plots are seen in Appendix C. Each page in the appendix presents

Table 3.1. Natural Frequencies and Damping Factors for Nominal Structure

Mode	Eigenvalue	Natural Frequency (Hz)	Damping Factor
1	-0.0010 $\pm$ j 48.64	7.741	0.002
2	-0.0011 $\pm$ j 55.77	8.876	0.002
3	-0.0011 $\pm$ j 55.77	8.876	0.002
4	-0.0023 $\pm$ j 115.90	18.446	0.002
5	-0.0023 $\pm$ j 115.92	18.449	0.002
6	-0.0024 $\pm$ j 117.51	18.702	0.002
7	-0.0034 $\pm$ j 167.84	26.713	0.002
8	-0.0036 $\pm$ j 180.21	28.681	0.002
9	-0.0036 $\pm$ j 180.23	28.685	0.002
10	-0.0038 $\pm$ j 189.62	30.179	0.002
11	-0.0041 $\pm$ j 205.17	32.654	0.002
12	-0.0041 $\pm$ j 205.29	32.673	0.002
13	-0.0042 $\pm$ j 208.20	33.136	0.002
14	-0.0042 $\pm$ j 208.29	33.150	0.002
15	-0.0042 $\pm$ j 208.40	33.168	0.002

the response of a particular output to a particular input. The truth model plot is located at the top of each page followed by the 12- and six-state reduced order plots, respectively. From these plots it can be seen that the 12-state reduced order model corresponds to the truth model at the lower frequencies, especially in the "X-axis disturbance response plots" (Figures C.1 to C.18) and the "Y-axis PMA response plots" (Figures C.91 to C.144). Figures C.19 to C.36 and C.37 to C.90 represent the "Y-axis disturbance response plots" and the "X-axis PMA response plots", respectively; there are low frequency discrepancies in every plot, although some are very small. The reason for these discrepancies is unclear and disturbing. Examination of the 6-state plots reveals good correspondence with the truth model at the low frequencies which are modeled in the six-state model. There does exist an unexplainable high frequency response from the 6-state model in Figures C.3, C.93 and C.117.

Note that since $\zeta = 0.002$ then the undamped and damped natural frequencies are essentially the same, $\omega \approx \omega_d$:

$$\omega_d = \omega(\sqrt{1 - \zeta^2}) = \omega(.999996) \qquad (3.75)$$

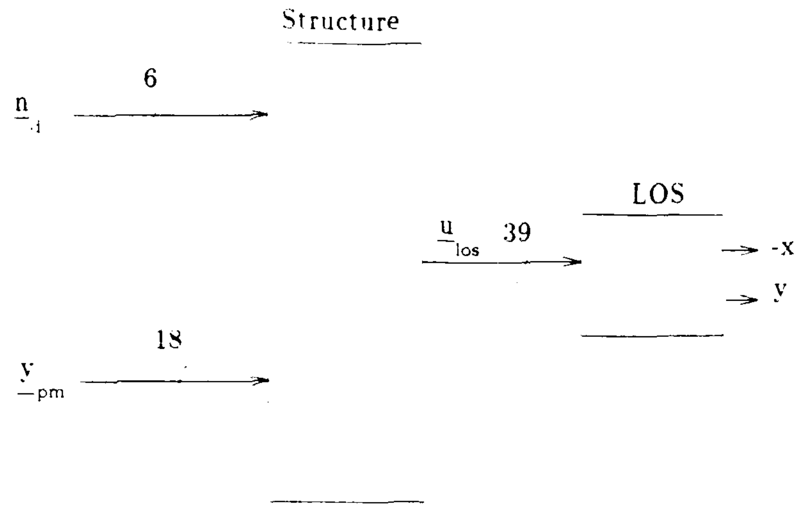

Figure 3.10. Block Diagram for Frequency Analysis

$$\omega = (1.000004)\omega_d \tag{3.76}$$

where ω is the undamped natural frequency and ω_d is the damped natural frequency.

3.6.2 Internally Balanced Reduction. Examining the diagonal terms of the gramians of the internally balanced truth model, divisions are observed between the fourth and fifth states, the sixth and seventh states, the tenth and eleventh, the twelfth and thirteenth states, and the fourteenth and fifteenth states. This can be seen in Table 3.2. The dimensions chosen for the reduced-order models from the internally balanced reduction method are six, twelve, and fourteen states. Six states

Table 3.2. Internally Balanced States and Gramians

State	Gramian	State	Gramian	State	Gramian
1	8.27308	6	7.54267	11	5.20624
2	8.26913	7	6.71664	12	5.18340
3	8.24005	8	6.68978	13	4.94938
4	8.23611	9	6.32928	14	4.92410
5	7.57290	10	6.30399	15	3.92980

was chosen over four states for performance reasons and direct comparison with the six-state modal reduced-order model. The 12-state model was chosen for direct comparison with the 12-state modal model. An extra model was developed due to the difference between the twelfth and thirteenth states being small in magnitude compared to the differences between the tenth and eleventh states and the fourteenth and fifteenth states. The fourteen state model was chosen over the 10-state model for performance reasons. The difference between the gramian diagonal terms related to states 12 and 13 is much smaller in magnitude then the difference between states 10 and 11 and states 14 and 15, and thus a reduction of the truth model to 14 states would be preferable over a reduction to twelve states with this technique. Also a large difference in gramian values correspond to a reduced order model of six states. For this research the two 12-state reduced order models will be of primary interest. As time permits, studies will be accomplished with two 6-state models and the 14-state internally balanced model. The system matrices for the three internally balanced models are displayed in Appendix B.

Bode amplitude ratio plots for the three internally balanced reduced order models were generated for the same open loop system in an identical manner as those generated in the previous section, and they are shown in Appendix D. Each page represents a particular output response for a particular input. The plots displayed, top to bottom, are the 14-, 12-, and 6-state internally balanced models, respectively. Comparing the internally balanced plots versus the reduced modal plots of Appendix C, the balanced plots have dynamic responses at higher frequencies, and the gain doesn't tail off at the higher frequencies, as anticipated. Also comparing internally balanced model plots of different model dimension, the higher the state model, the better the response at the higher frequencies. The 14-state model provides more definition at the higher frequencies versus the 12-state model.

3.7 Physical System Parameter Uncertainty

The uncertain parameters to which adaptive estimation will be applied are the damping ratio ζ and the natural frequency ω. As discussed in Section 3.4.2, ζ and ω have direct effect on the mass and stiffness of the structure. Possible causes for variation in these parameters were also discussed in Section 3.4.2. A 3-by-7 discretized parameter space will be constructed with position (2,4) representing the nominal parameters. It is expected that sensitivity to variations in the damping ratio

will be much less than sensitivity of the controller to variations in ω, so the ζ axis is the short axis (three discretized points). The nominal system's LQG controller is expected to be very sensitive to the variation of the natural frequency, ω [3]; thus the ω axis is divided more finely, into seven point values. A sensitivity analysis is accomplished to determine the appropriate parameter values along each axis. The actual discretization process will be discussed in Chapter 4.

3.8 Summary

This chapter presented the structure in which a MMAC will be developed to quell vibrations introduced into the structure. The structure is the SPICE structure presently being tested at Phillips Laboratory. The actual physical shape was presented along with two mathematical frames in which to model the structure. Also discussed were the methods with which to reduce the number of states describing the structure. A 194-state system truth model was presented which models the disturbances, actuators and sensors. Five reduced order models were developed; two by the modal reduction technique and three by the internally balanced technique. Concluding this chapter was a discussion on the discretization of the parameter space.

The following chapter will discuss the procedures necessary to develop and implement a MMAC for the SPICE structure.

IV. Simulation

4.1 Introduction

This chapter discusses the "tools" used to analyze the MMAE and MMAC estimation and controller capabilities to estimate and quell vibrations induced on the SPICE structure presented in Chapter 3. These tools are (1) Monte Carlo analysis, (2) simulation software, and (3) analysis plan.

4.2 Monte Carlo Analysis

To obtain statistical descriptions of the multiple model adaptive estimator and controller algorithms' performance, a Monte Carlo analysis is necessary. The information needed for this analysis is acquired by the simulation software. If the system being examined were completely linear, a covariance analysis could be conducted [20:329]. The adaptive nature of the MMAE technique used to control the structure necessitates the need for a Monte Carlo analysis to obtain many samples of the process and to evaluate the sample statistics of the process. As stated in Chapter 3, this simulation will analyze a 194-state truth model against a filter model with a full-order structure model, two filter models with modal reduced structure models and one filter model with an internally balanced reduced order model. The reason for only one simulation of a filter containing an internally balanced structure model is that poor performance is achieved; the performance capability will be presented in Chapter 5. The truth model is considered an accurate representation of the "real world" and will be employed to evaluate the reduced order models. There are two kinds of simulations. The first analyzes the estimator and the second analyzes the controller. This is depicted in Figure 4.1. The variables depicted in Figure 4.1 are as follows:

- $\underline{\mathbf{x}}_t(t_i)$: the truth model states; 194-dimensional and in modal coordinates
- $\hat{\underline{\mathbf{x}}}_f(t_i)$: estimates of the system states; 60-, 66- or 134-dimensional
- $\mathbf{a}_t(t_i)$: the vector representing the true structure damping ratio and undamped natural frequency parameters
- $\hat{\underline{\mathbf{a}}}(t_i)$: estimates of the uncertain parameter vector

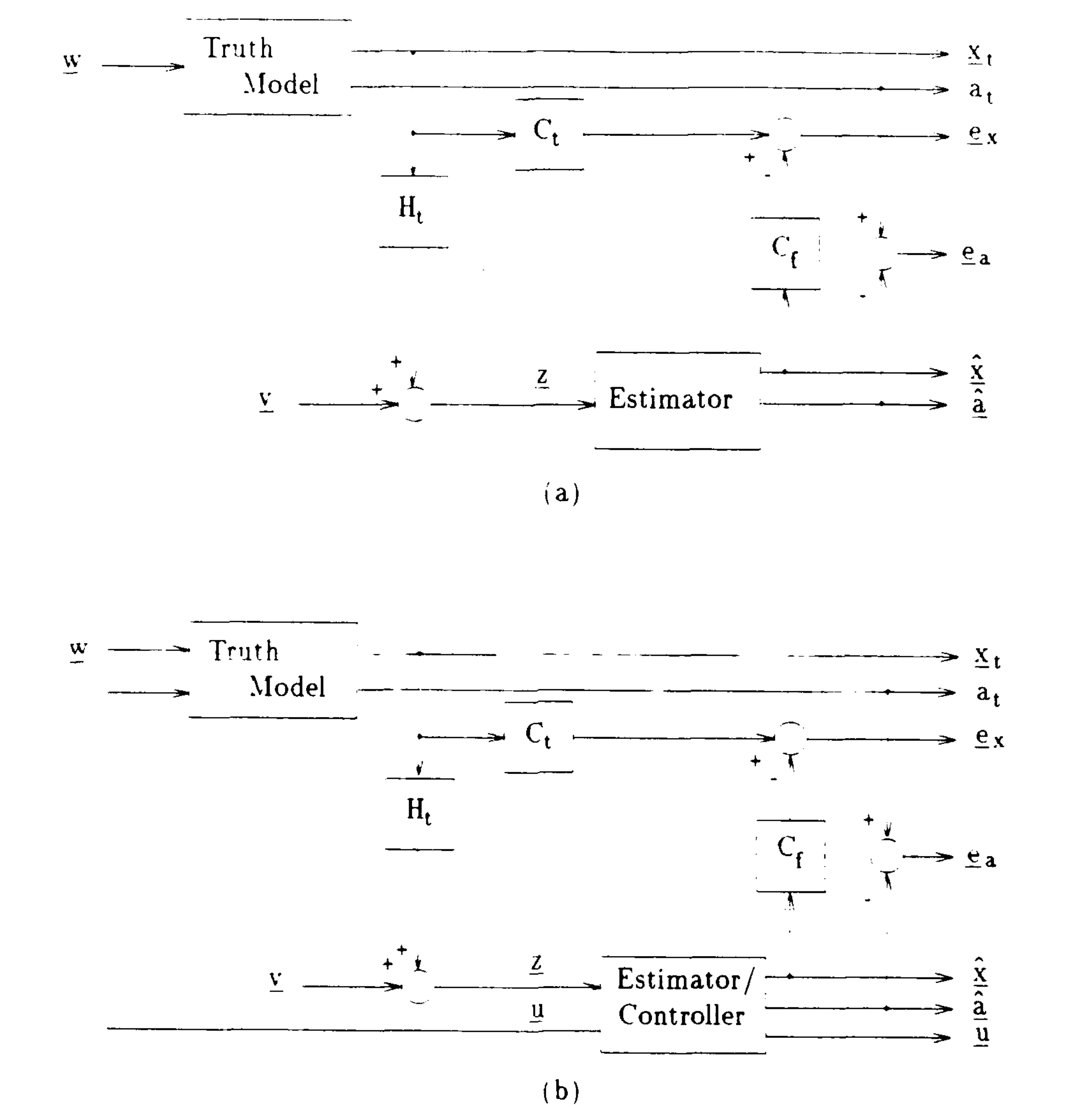

Figure 4.1. Diagram of (a) Estimator Simulation, and (b) Controller Simulation [30]

- $\underline{e}_i(t_i)$: the error in the parameter estimate defined as $\underline{e}_i(t_i) = \mathbf{a}(t_i) - \hat{\underline{a}}(t_i)$.
- $\underline{e}_x(t_i)$: the error in the system estimate

The following sections will present the error vector formulation and the error vector statistics.

4.2.1 Error Vector Formulation. This study is concerned with LOS deviations. Evaluation of the LOS deviations will indicate the performance capability of the reduced order models developed in Chapter 3. Therefore, an error vector describing the inaccuracy of the reduced order filter model to estimate the X- and Y-LOS deviation is required. The X-axis deviation error vector is computed by subtracting the true X-axis deviation from the estimated X-axis deviation in Figure 4.1(a). The Y-axis deviation error vector is computed similarly. The equation to determine the error vector is as follows:

$$\underline{e}_x(t_i) = \grave{\mathbf{C}}_t \underline{\grave{\mathbf{x}}}_t(t_i) - \sum_{j=1}^{K} \grave{\mathbf{C}}_{f_j} \hat{\underline{\grave{\mathbf{x}}}}_{f_j}(t_i) \cdot p_j(t_i) \tag{4.1}$$

where $\grave{}$ represents the modal coordinate frame as described in Section 3.4.2. $\grave{\mathbf{C}}_t$ is truth model output matrix used to determine the LOS deviations in the X-axis and Y-axis and $\grave{\mathbf{C}}_{f_j}$ is a modal filter model output matrix. The output matrix can be replaced with $\check{\mathbf{C}}_{f_j}$ to represent an internally balanced filter output matrix. For the remainder of this chapter the ($\grave{}$) and ($\check{}$) will be dropped when referring to the filter, with the assumption that either of the reduced order model forms may be implemented in the filter. The subscript f represents filter and the index j indicates which of the K bank filter's weighted estimates are being summed. The form of the error vector is given as follows:

$$\underline{e}_x(t_i) = \begin{bmatrix} e_{x_1} \\ e_{x_2} \end{bmatrix} = \begin{bmatrix} \text{x-axis LOS position error} \\ \text{y-axis LOS velocity error} \end{bmatrix} \tag{4.2}$$

The simulation depicted in Figure 4.1(b) implements a controller for closed-loop estimation and control. The controller is designed to regulate the position deviations, thus quelling any vibrations in the structure. The generation and statistical analysis of the regulator error signals is completed in a similar manner as the estimator

evaluation study. The outputs of concern are the actual X-axis and Y-axis deviations which are determined from the following equation:

$$\underline{\mathbf{e}}'_r(t_i) = \dot{\mathbf{C}}_t\underline{\mathbf{x}}_t(t_i) \tag{4.3}$$

where $\underline{\mathbf{e}}'_r(t_i)$ is the vector of true LOS deviations.

4.2.2 Error Vector Statistics. The sample means and covariances of the estimation error and control processes are the statistics of primary concern. The mean is computed by [14:74],[34:67]:

$$\mathbf{E}\{\underline{\mathbf{e}}_r(t_i)\} \approx \mathbf{M}_{e_r}(t_i) = \frac{1}{L}\sum_{k=1}^{L}\underline{\mathbf{e}}_{r_k}(t_i) \tag{4.4}$$

where L is the number of Monte Carlo analysis runs made and $\mathbf{e}_{r_k}(t_i)$ is the value of the error signal during the k^{th} simulation run at run time t_i. The covariance of the mean error signal may be determined by [20:130]:

$$\begin{aligned}\mathbf{P}_{e_r}(t_i) &= \mathbf{E}\{[\underline{\mathbf{e}}_r(t_i) - \mathbf{E}\{\underline{\mathbf{e}}_r(t_i)\}][\underline{\mathbf{e}}_r(t_i) - \mathbf{E}\{\underline{\mathbf{e}}_r(t_i)\}]^T\} \\ &\approx \frac{1}{L-1}\sum_{k=1}^{L}\{\underline{\mathbf{e}}_{r_k}(t_i)\underline{\mathbf{e}}_{r_k}^T(t_i)\} - \frac{L}{L-1}\mathbf{M}_{e_r}(t_i)\mathbf{M}_{e_r}^T(t_i)\end{aligned} \tag{4.5}$$

The statistics for the parameter estimation errors, $\underline{\mathbf{e}}_a(t_i)$, and the true LOS deviations, $\dot{\mathbf{C}}_t\underline{\mathbf{x}}_t(t_i)$ are obtained by making the proper substitutions in Equations (4.4) and (4.5). The sample statistics calculated in this research will be based on ten Monte Carlo runs, in which each run will have a duration of seven seconds.

A second statistical element computed is the temporal average of the RMS value. This result is computed by implementing the following equation:

$$\epsilon_{rl} = \frac{1}{N}\sum_{j=i-N+1}^{i}\sqrt{[\mathbf{M}_{e_r}(t_j)\mathbf{M}_{e_r}^T(t_j) + \mathbf{P}_{e_r}(t_j)]_{ll}} \quad \text{for } l = 1 \text{ and } 2 \tag{4.6}$$

where ϵ_{rl} is the temporal average of the l^{th} component of $\underline{\epsilon}_r$ or $\underline{\epsilon}'_r$ and N is the number of sample periods. For this research the temporal average will be taken over the last three seconds of the run duration.

4.3 Simulation Software

4.3.1 Introduction. Previous thesis efforts [6, 10, 11, 14, 29, 30, 31] in the application of MMAE/MMAC algorithms to quell vibrations in a large flexible space structure developed simulation software for the two-bay truss structure discussed in Chapter 1. Upon receipt, this software was resident on a DEC VAX-11/785 superminicomputer and an ELXSI 6400 superminicomputer at AFIT. This software was broken into three programs: (1) preprocessor, (2) processor, and (3) postprocessor. This section will discuss the functions and the modifications made to these three programs.

4.3.2 Preprocessor: Inherited Preprocessor. The preprocessor software originally resided on the DEC VAX-11/785 computer due to dependence on IMSL [7] library subroutines. Another library of subroutines used by the preprocessor was LQGLIB [17]. In the physical coordinate frame, the original preprocessor generated the state space matrices from mass and stiffness matrices for the entire parameter space. A transformation to the modal coordinate frame was then accomplished. Then each of the state space equations was discretized, followed by the computation of the steady-state constant values of the Kalman filter gains, the filter covariance, the filter residual covariance, and the LQG controller gains for the discretized space. This program received information from two input files. The first input file provided state and control weighting matrices, the dynamics driving noise strength matrix, the measurement noise covariance matrix and the sample time. The second input file passed mass and stiffness matrices that described the two-bay truss system [29]. Output files contained the truth model and filter model matrices.

Present Preprocessor. The SPICE structure was delivered in modal form and in a form compatible with MATRIXx System Build [19]. Initially, the preprocessor was rewritten to read in the continuous state-space equation matrices from a MATRIXx output file and then to discretize these matrices. Also, this version of the preprocessor would then calculate the steady-state constant values of the Kalman filter gains, the filter covariance, the residual covariance and the controller gains. After a considerable amount of debugging, several discrepancies were found in the inherited preprocessor code and corrected in the present code. The first error was found in the calculation of the inverse residual covariance; the wrong temporary storage variable was used. A second discrepancy was found in LQGLIB's computation

of the Kalman filter gain. Also, this discrepancy affected the computation of the controller gain. Since this discrepancy did not appear to effect the results of past research, it appears that the large dimensions of the SPICE system may have exceeded LQGLIB's matrix dimensions. This discrepancy resulted in a second rewrite of the preprocessor software.

The latest version (and working version) of the preprocessor implements a MATRIXx portion and a FORTRAN portion of code. The MATRIXx code discretizes the state space equations, computes the Kalman filter gains, and calculates the controller gains. This informr_:ion is then stored and read in by the FORTRAN portion of the preprocessor code. The FORTRAN code determines the filter state covariance and residual covariance and then stores all the information required by the processor in a format that the processor can read. Due to the elimination of the DEC VAX-11/785 superminicomputer and its associated usage of the IMSL library and implementation of MATRIXx software, the preprocessor is now resident on the SUN workstations at AFIT.

4.3.3 Processor: Inherited Processor. The processor code uses the output generated by the preprocessor to simulate the moving bank controller applied to the SPICE 2 structure via Monte Carlo analysis. The processor updates the true system and the measurements from this system are then used to update the filter and controller. This software implements a random number generator to produce the necessary white Gaussian noise vectors for measurement noise and dynamics driving noise. The preprocessor also performs bank movements, contractions, and expansions as dictated by the logic discussed in Section 2.4. This program requires one library, LQGLIB, and is computationally intensive; therefore, the processor software was implemented on the faster ELXSI 6400 computer. Output is stored at the end of each sample time to be postprocessed. This program was specifically written (i.e., hard-coded) for the two-bay truss structure.

Present Processor. The present processor performs the same functions as the inherited version. Changes were made to eliminate the rigidity of the processor by replacing the hard-coded portion of the code with variables defined in an 'include' file. This change will expedite any code variations due to structure/system modifications. Two code discrepancies were found in the inherited processor code and corrected. The first was found in the residual calculation. The filter's assumed white noise

component was erroneously simulated and added into the filter's estimate of the measurement. This is incorrect since the white noise vector has a mean value (i.e., estimated value) of zero. The second error was found in the controller logic. The negative sign of Equation (4.10) was accounted for twice, thus negating the sign altogether. The processor software can be executed from the SUN workstations or the ELXSI 6400 superminicomputer.

4.3.4 Post Processor: Inherited Post Processor. This code manipulates the results of the processor software into meaningful plots, i.e., mean $\pm$ one standard deviation graphs plotted versus time. The parameters of primary interest are the position estimation errors and the position deviations once control is applied. The output results from this program are compatible with GNUPLOT plotting routine [8].

Present Post Processor. The current post processor version differs from the inherited version in that the variables are soft-coded and that the temporal average defined in Equation (4.6) was added to the code. Like, the processor software, the post processor code can be executed from the SUN workstations or the ELXSI 6400 superminicomputer.

4.4 Analysis Plan

The thrust of this research will determine which, if any, reduction method, modal or internally balanced, provides the better filter/controller design model for error estimation and regulation control of position deviations. Sensitivity of the filter model to parameter variations will also be determined and, thus, the parameter space discretization will be established so as to achieve desired controller performance. The remaining portion of this chapter will describe the analysis to be taken in order accomplish the stated tasks.

4.4.1 Dynamic Noise Strength and Measurement Noise Covariance Determination. The determination of the dynamics driving noise and measurement noise covariance for the filter/controller design model must be accomplished prior to continuing the analysis. The truth model values for the continuous dynamics driving noise strength and measurement noise covariance, $\mathbf{Q}_t$ and $\mathbf{R}_t$ respectively, are first determined. The filter equivalents, $\mathbf{Q}_f$ and $\mathbf{R}_f$, will then be determined. The SPICE

model was developed with $\mathbf{Q}_t$ equal to the identity matrix [3]. As seen in Figure 3.3. all of the truth model filter noises are being altered by shaping filters, even the measurement noise. The equivalent discretized dynamics driving noise, $\mathbf{Q}_{d_t}$, is computed as presented in Equation (2.13). Modeling the measurement noise shaping filter in state space and augmenting these states to the system state space equation, results in no white measurement noise for the truth model (i.e., all measurement noise is really time-correlated). The filter's measurement noise covariance is computed from the following equation:

$$\mathbf{R}_f = \mathbf{H}_{na}\left[\int \mathbf{\Phi}_{na}\mathbf{G}_{na}\mathbf{Q}_{na}\mathbf{G}_{na}^T\mathbf{\Phi}_{na}^T d\tau\right]\mathbf{H}_{na}^T \tag{4.7}$$

where the subscript na refers to shaping filter matrices for the accelerometers discussed in Section 3.3.4. The bracketed term is the discrete white noise strength, $\mathbf{Q}_{na}$, and the pre- and postmultiplication by the shaping filter's measurement matrix transforms $\mathbf{Q}_{na}$ into an equivalent measurement noise covariance, $\mathbf{R}_f$, representation. Values for $\mathbf{Q}_{d_f}$ can now be determined by tuning the filter standard deviation to the true error plus true error standard deviation; this procedure will be presented in detail in Chapter 5. These values of $\mathbf{Q}_{d_f}$ are a result of the reduced order of the filter model. Care must be taken not to mask out the performance of elemental filters. If too much dynamics driving pseudonoise is added to filter models, differences between filters could be hidden, which would make identification of the proper filter for parameter estimation very difficult.

4.4.2 Controller Weighting Matrices. The state weighting matrix and the control weighting matrix are constructed as follows:

$$\mathbf{X} = \rho_x\mathbf{C}^T\mathbf{C} \tag{4.8}$$

$$\mathbf{U} = \rho_u\mathbf{I} \tag{4.9}$$

where $\mathbf{X}$ and $\mathbf{U}$ are the state and control weighting matrices first defined in Equations (1.7), $\mathbf{C}$ is the filter output matrix, $\mathbf{I}$ is an 18-by-18 identity matrix, and ρ_x and ρ_u are the scalar weights. In actuality, Kirtland [16] specified the quadratic cost in integral form versus summation form, but for sample periods that are small relative to the characteristic times of the system the two forms are essentially equivalent.

Initial values of the weights were obtained from Kirtland AFB. These values are [16:V-63]:

$$\rho_x = \frac{1}{[0.75\epsilon-6 \text{ radians}]^2} \tag{4.10}$$

$$\rho_u = \frac{1}{[85.0 \text{ newtons}]^2} \tag{4.11}$$

The tuning of the controller will only involve the adjustment of the weight affecting the state weighting matrix. The procedures used to tune the controller are described in detail in Chapter 5.

4.4.3 Model Analysis. Initial analysis of the estimator and controller will be accomplished by assuming a truth model with a basic structure size of six states, and thus, a truth model system dimension of 120 states. The basic structure consists of the structural bending states without sensor, actuator, disturbance or noise shaping filters. The initial filter model will consist of the same structure size but the colored noise will be replaced with white noise as discussed in Chapter 3. The resulting filter model will be 60 states. The purpose of examining a smaller dimension (and a computational less burdensome) truth model is to obtain insights to aid in the analysis of the 194-state truth model. Following the initial analysis using the "small truth model", the full 194-state truth model (80 structure states) will be employed for remaining analysis. Due to the discrepancies found in Chapter 3 when comparing the reduced-ordered models, particularly the 66-state modal model, a full structure state filter model (truth model with white noise replacing time-correlated noise generated by shaping filters) will be added to the analysis. The order in which the filter models will be examined with the truth model is the following: (1) 134-state filter model (80 structure states), (2) 66-state filter modal model (12 structure states), (3) 66-state filter internally balanced model (12 structure states), (4) 60-state filter modal model (6 structure states), (5) 60-state filter internally balanced model (6 structure states), and (6) 68-state filter internally balanced model (14 structure states). To reiterate, the reason for the large number of filter models is to determine which, if any, filter model appropriately represents the truth model and is capable of quelling any oscillations introduced into the structure to the required specification. The required specification for the LOS X-axis and Y-axis deviations is a one micro-radian RMS deviation in each of the axes [3]. The true error will be monitored to determine the estimator's ability to estimate the true states, and the X- and Y- rue position will

be monitored to determine the controller's ability to drive the position deviations to values that meet specifications.

4.4.4 Sensitivity Analysis. Upon completion of the model analysis, the robustness of a single filter/controller will be determined by implementing a parameter sensitivity analysis. The sensitivity analysis is accomplished by varying one parameter of the truth model at a time (e.g., ω) in one direction until the filter, based on the nominal parameter point, becomes unstable. This parameter variation, denoted $\delta\omega_1$, is then used to generate the first new discrete value in the three-by-seven parameter space for the MMAE and controller. To determine the remaining parameter points in the space, the filter and truth models are modified to represent the new ω found in the first sensitivity analysis. A sensitivity analysis is then accomplished about this new nominal parameter point by continuing the parameter variation of the truth model and determining a new $\delta\omega_2$. This procedure is repeated until the parameter discretization in completed in the initial direction of varying the parameter from the nominal point, then the procedure is repeated from the original nominal point in the opposite direction of initial parameter variation. Figure 4.2 illustrates this procedure. After completing the space discretization, the structure plant models for each point in the space can be created.

4.4.5 Parameter Identification Following the parameter space discretization, simulations will be run to determine the moving bank of filters' ability to identify the true parameter value. The moving bank will initially be a three-by-three set of filters capable of moving along the ω axis (the three discrete values of the ζ axis are covered by bank). The initial simulation will set the center of the bank over the true parameter value at ω_4 (see Figure 4.2). The following two tests will set the true ω value at ω_2 and ω_6 with the bank of filters centered at ω_4. The final two tests will initially set the true parameter value to ω_4 and then let the parameter value suddenly jump to ω_2 or ω_6. Due to initial results in parameter identification, these simulations were altered and these changes are explained in detail in Chapter 5.

4.5 Summary

This chapter presented details required to perform simulations for this thesis. The purpose of implementing Monte Carlo analysis, the simulation software, and

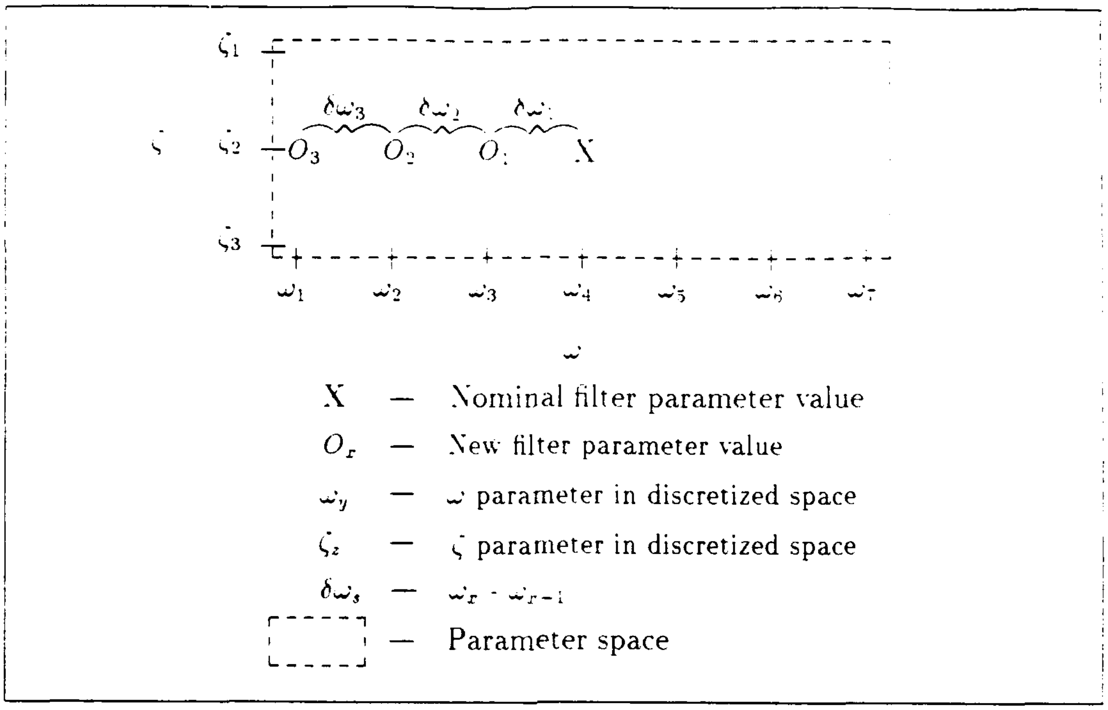

Figure 4.2. Discretization of Parameter Space

the simulation plan of attack were presented. The following chapter will present the results of the simulations.

V. Results

5.1 Introduction

The purpose of this thesis is to develop an estimator/controller that can quell oscillations introduced in a flexible space structure. Nonadaptive controllers designed to date [4] do not exhibit sufficient robustness to design parameter variations to be useful in actual implementation. Therefore, a multiple model adaptive controller (MMAC), composed of a bank of Kalman filters and LQG controllers, has been developed to estimate and quell the vibrations. This chapter will discuss the effectiveness of the estimators developed for the two types of reduced order models presented in Chapter 3 and discuss which filter, if any, meets the requirements levied by the Phillips Laboratory. The controller algorithm used in this study is the modified MMAC algorithm discussed in Section 1.1.4. Before anything else is presented, the procedure with which the filters and controllers were tuned will be discussed.

5.2 Tuning Procedures

5.2.1 Introduction. This section discusses the procedures implemented in tuning the filter and tuning the controller. Also presented in this section is a test simulation which was used to gather insightful information about tuning the reduced ordered filters and controllers developed for the SPICE structure.

5.2.2 Filter Tuning. Tuning of the filters was accomplished visually by examining the plots of the true error mean $\pm$ one standard deviation (sigma) with the filter-computed error mean $\pm$ sigma plotted on the same plot. To obtain the optimal filter design, it is desired to have the filter's $\pm$ sigma roughly match 68.3 % of the values of a one-run test, or $\pm$ sigma of the filter to match the mean $\pm$ the sigma of the truth in a true Monte Carlo analysis. The filter error sigma bounds may be moved by adjusting (tuning) the dynamics noise covariance, $\mathbf{Q}_f$, of the filter, as seen in Equations (2.18) and (2.21). The $\mathbf{Q}_f$ values that are adjusted enter the structure at the disturbance inputs and the PMAs. In this study, the method used to obtain the desired filter error sigma value was to set the $\mathbf{Q}_f$ to a common value, such as one, and then execute a ten-run Monte Carlo simulation. From the resulting true error mean $\pm$ sigma plot, an approximate value for the desired filter sigma value can

be obtained for the X and Y axes. The primary method of tuning $\mathbf{Q}_f$ was accomplished by adjusting all the driving noise values by a scalar multiplier. Adjusting $\mathbf{Q}_f$ for each noise input can be done, but by tuning all $\mathbf{Q}_f$ together conserves the time required for tuning. This works well as long as the filter model displays very weak or no coupling in the three coordinate axes and as long as the desired one-sigma filter-computed values of the X- and Y-axis error statistics were about the same. For the most part, this procedure worked, but there were cases when the desired one-sigma filter values were not the same (recall the SPICE structure is *not* the same in the X and Y axes due to tripod characteristics seen in Figure 3.1). For this situation the scalar multiplier was set to one and the individual $\mathbf{Q}_f$ values were adjusted to affect the appropriate axis as desired. This tuning became tedious when significant coupling between axes existed. This thesis implements the same tuning values determined for the nominal filter in each of the filters in the parameter space. For this reason, the filters, for the most part, were conservatively tuned (i.e., filter sigma exceeds the true error mean $\pm$ sigma) to reflect the plant changes as the parameters varied.

5.2.3 Controller Tuning. As stated in Chapter 4, tuning of the controller was accomplished by adjusting the scalar weight affecting the state weighting matrix. The scalar weight given by [16] for the controller weighting matrix was determined to be a maximum value. The state scalar weight was adjusted until the instability point of the closed-loop system was discovered. Using the weight for the state weighting matrix to determine the instability point ensured that the "tightest" state values will be obtained for this application. Once the instability point was found, the weight was tuned back by 10 percent. Weighting values closer than 10 percent presented equivalent or degraded regulation of the X- and Y-axis deviations, thus 10 percent a rollback was chosen. This method of tuning provided effective control and diminished sensitivity to tuning variations.

5.2.4 Test Simulation. An initial study was completed examining the six-state filter structure model (60 total filter system states) against an assumed six-state truth model for the structure (120 total assumed true system states). The six-state structure model is the same one defined in Section 3.6.1. The six-state truth model is identical to the filter model except that the colored noises are retained. From this study, initial insights for tuning of the filter and controller were gained, such as

the procedures to tune $\mathbf{Q}_f$ described earlier. The first of the "insight" simulations used only accelerometer measurements (original **H** matrix). Figures 5.1 and 5.2 illustrates the true error mean $\pm$ one sigma, for a ten-run Monte Carlo simulation, of the filter's estimate of the output variables of interest values and the actual output variable values.

Also available on these plots is the results of tuning the filter. The constant lines are the updated standard deviations of the filters estimate. Remember, the filter has a mean value of zero and that constant steady-state gain was assumed. As stated earlier, it is desired to have the filter's one-sigma values match the true error $\pm$ one sigma plot for optimality. The bounds displayed in Figures 5.1 and 5.2 were tuned a little conservatively since the tuning values obtained for the nominal plant in the discretized space will be implemented in all of the filters defining the space in this study. The discrete dynamics driving noise matrices and measurement noise covariance matrices for the truth model and filter models are found in Appendix E.

Figures 5.3 and 5.4 display the open-loop (no control applied) deviations of the actual X and Y LOS variables. These plots illustrate the need for a controller (in this case an LQG controller) to quell the oscillations in the structure. The deviations are much larger than the one micro-radian RMS value constraint required by Phillips Laboratory.

Adding an LQG controller to close the loop resulted in a dramatic reduction in the LOS deviations; this is depicted in Figures 5.5 and 5.7. It should be noted that the controller was not activated until 0.5 seconds into the simulation. A "blown-up" depiction of the controller effect is shown in Figures 5.6 and 5.8. Although a dramatic improvement in the LOS deviations was obtained, specifications were not met. This resulted in the implementation of the second measurement matrix (expanded **H**) described in Chapter 3. Using the relative velocity and position of the PMA's mass to the PMA's point of attachment to the structure in the measurement vector, as well as the original accelerations, resulted in approximately 4.5 percent improvement in the X-axis LOS deviation and approximately two percent improvement in the Y-axis LOS. The differences in LOS improvements between the two axes can be attributed to the model of the structure, particularly the tripod. Figures 5.9 through 5.14 show the results of implementing the expanded measurement matrix. As yet, the performance is far from the one micro-radian specification on RMS deviations.

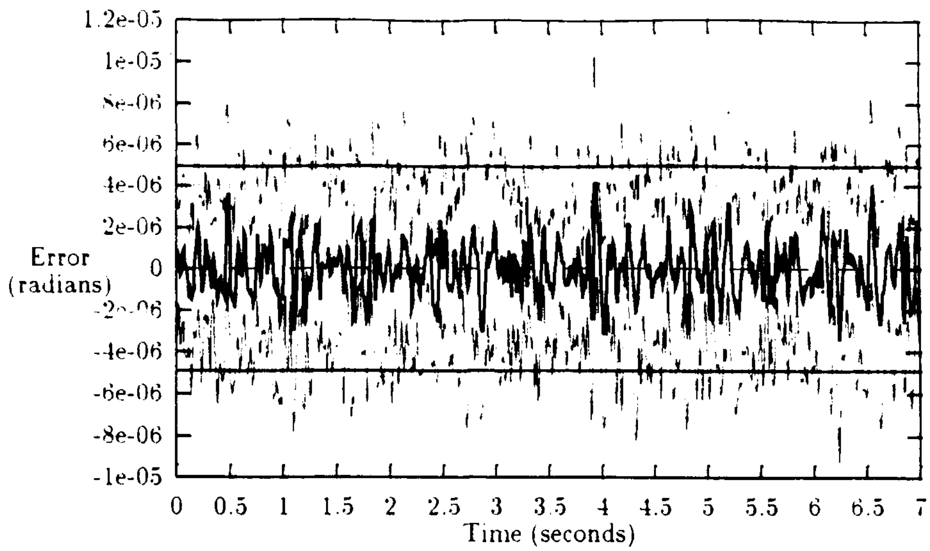

Figure 5.1. 60-State Filter Model versus 120-State Truth Model: X-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

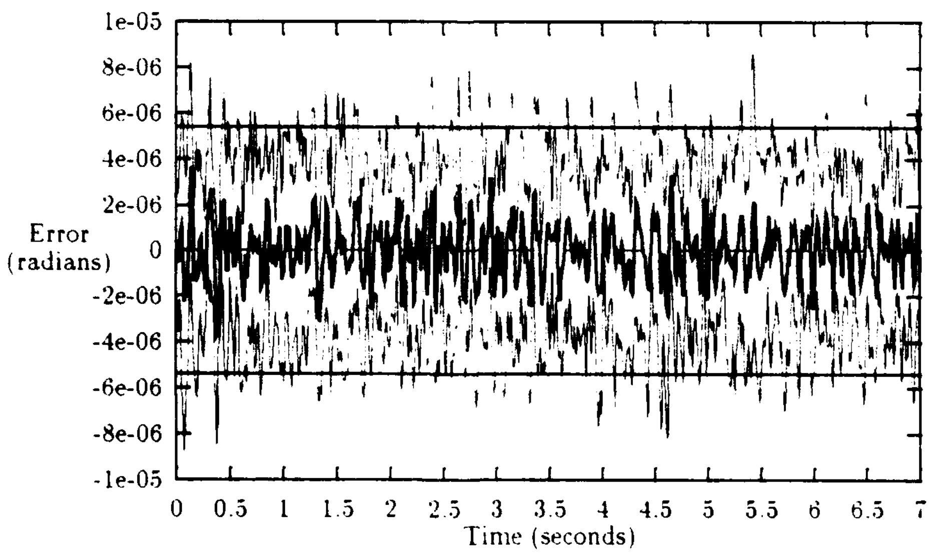

Figure 5.2. 60-State Filter Model versus 120-State Truth Model: Y-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

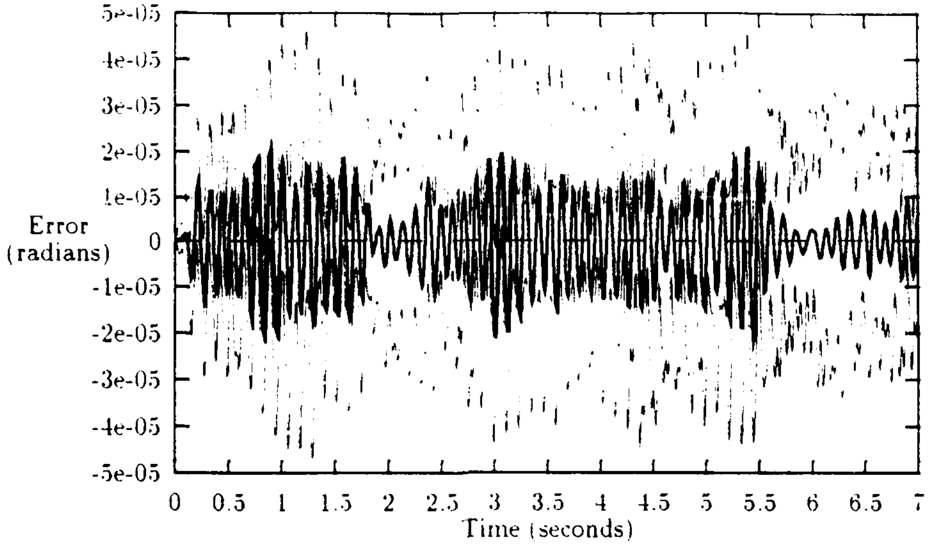

Figure 5.3. 60-State Filter Model versus 120-State Truth Model: X-Axis LOS Error Mean $\pm$ One Sigma with No Control Applied

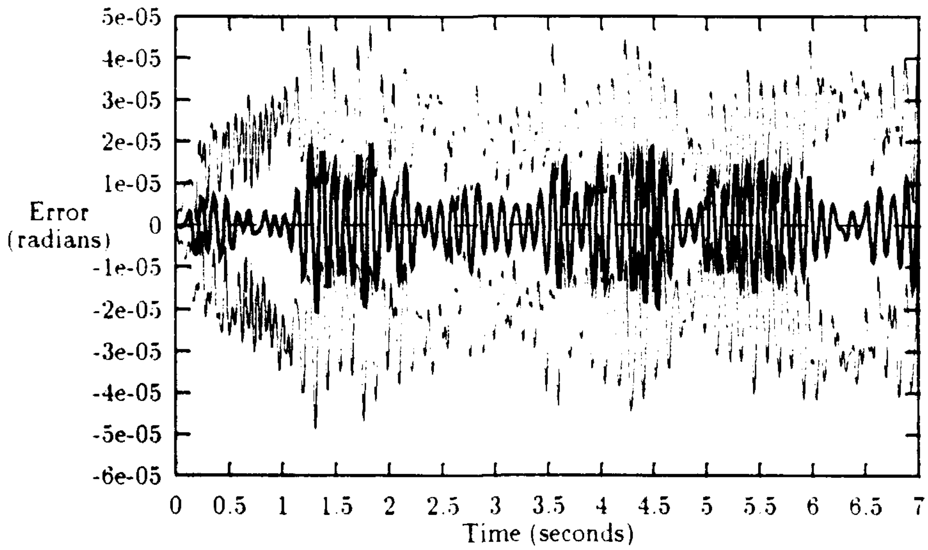

Figure 5.4. 60-State Filter Model versus 120-State Truth Model: Y-Axis LOS Error Mean $\pm$ One Sigma with No Control Applied

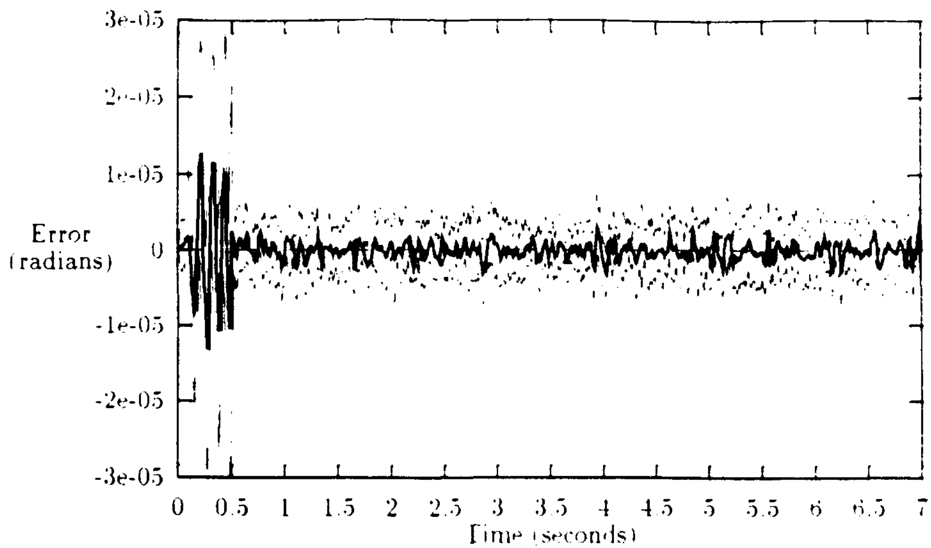

Figure 5.5. 60-State Filter Model versus 120-State Truth Model: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

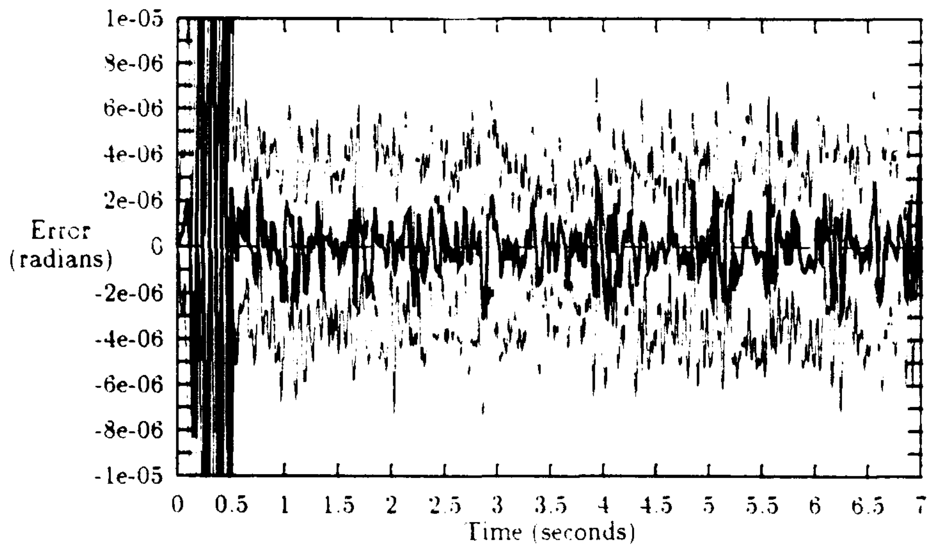

Figure 5.6. 60-State Filter Model versus 120-State Truth Model: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied (enlarged scale)

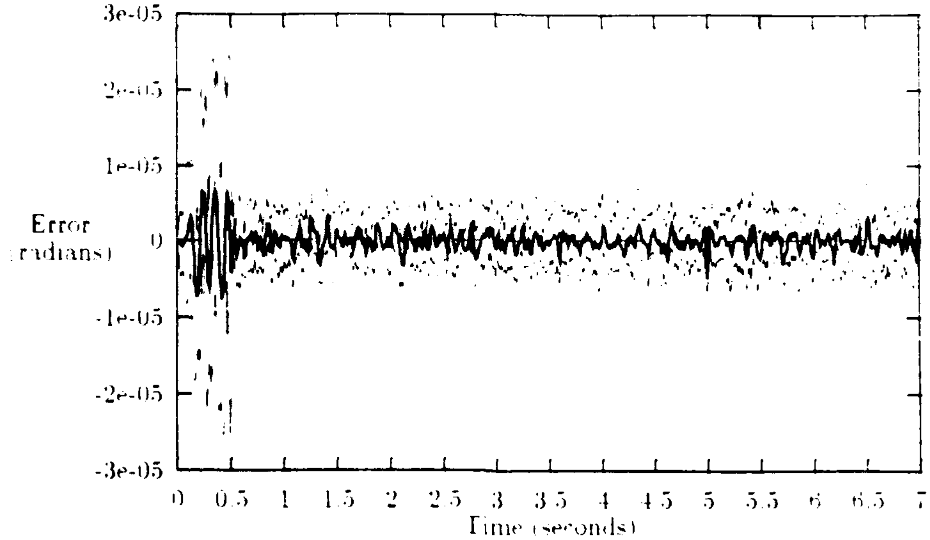

Figure 5.7. 60-State Filter Model versus 120-State Truth Model: Y-Axis LOS Error Mean ± One Sigma with Control Applied

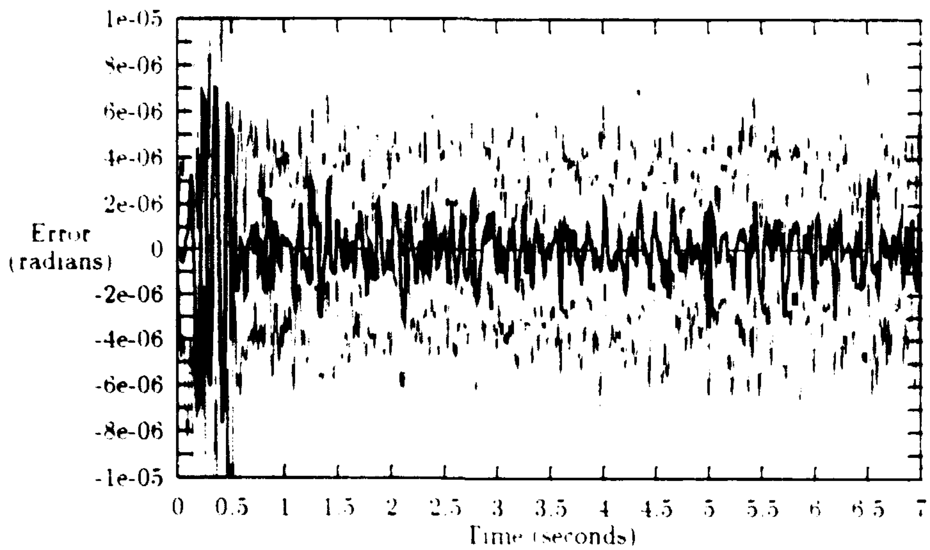

Figure 5.8. 60-State Filter Model versus 120-State Truth Model: Y-Axis LOS Error Mean ± One Sigma with Control Applied (enlarged scale)

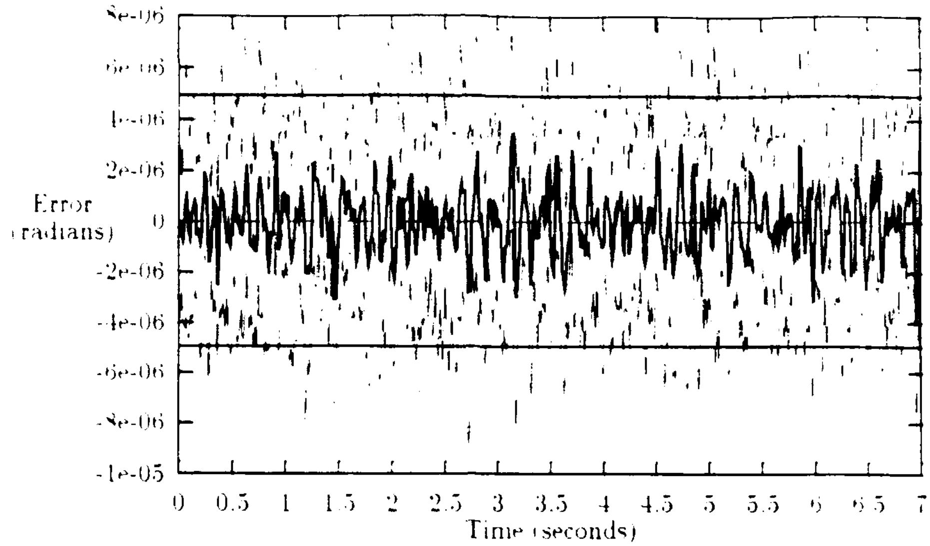

Figure 5.9. 60-State Filter Model versus 120-State Truth Model with Expanded **H** Matrix: X-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

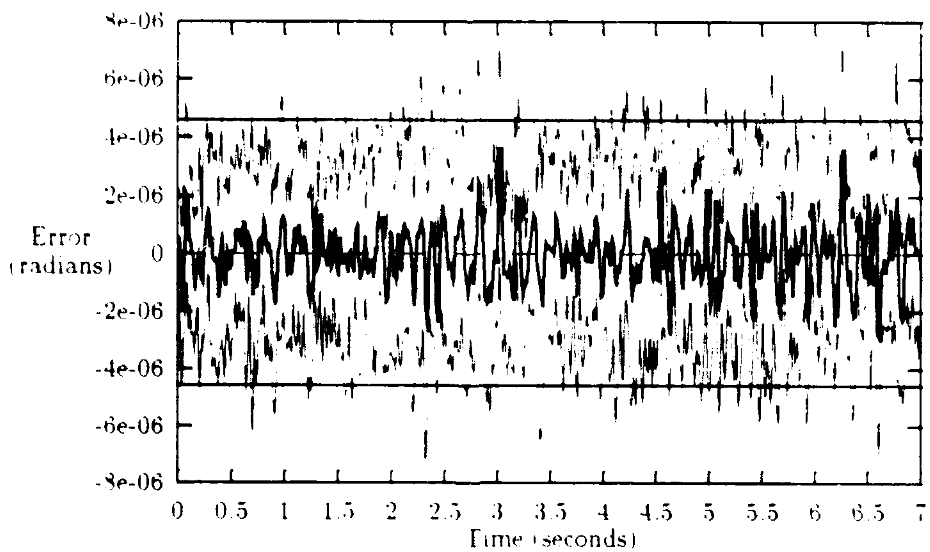

Figure 5.10. 60-State Filter Model versus 120-State Truth Model with Expanded **H** Matrix: Y-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

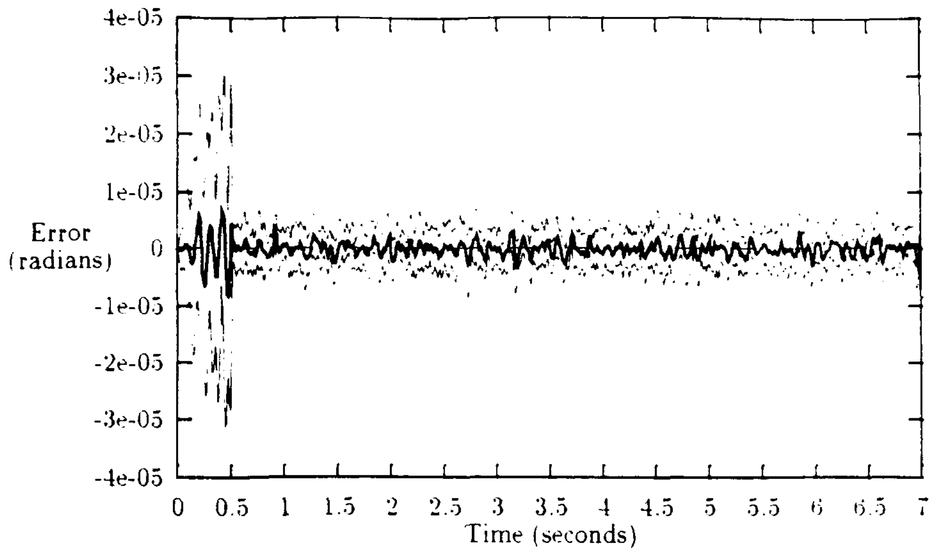

Figure 5.11. 60-State Filter Model versus 120-State Truth Model with Expanded **H** Matrix: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

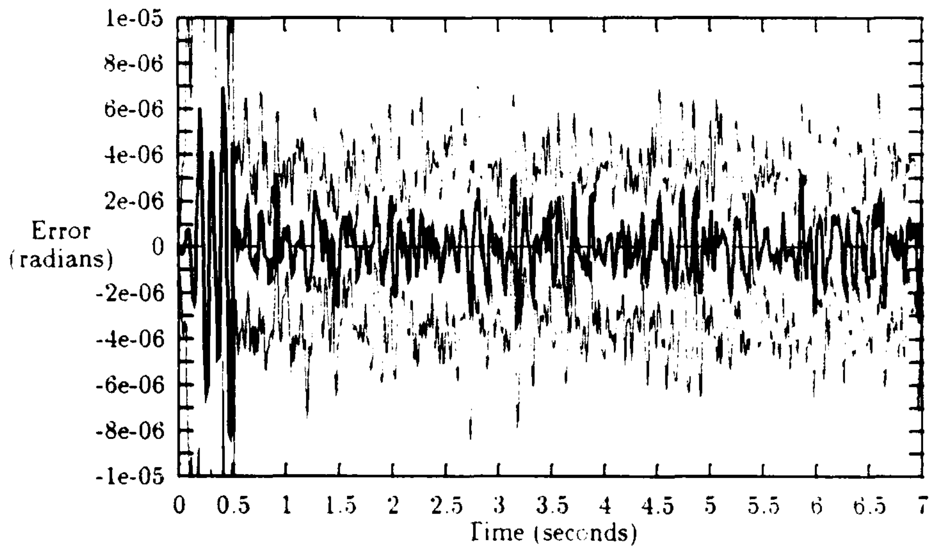

Figure 5.12. 60-State Filter Model versus 120-State Truth Model with Expanded **H** Matrix: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied (enlarged scale)

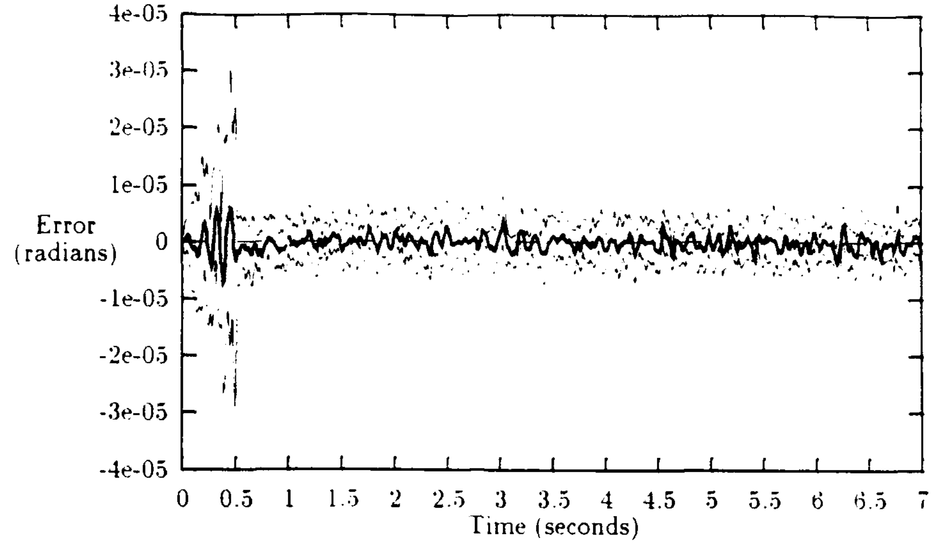

Figure 5.13. 60-State Filter Model versus 120-State Truth Model with Expanded **H** Matrix: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

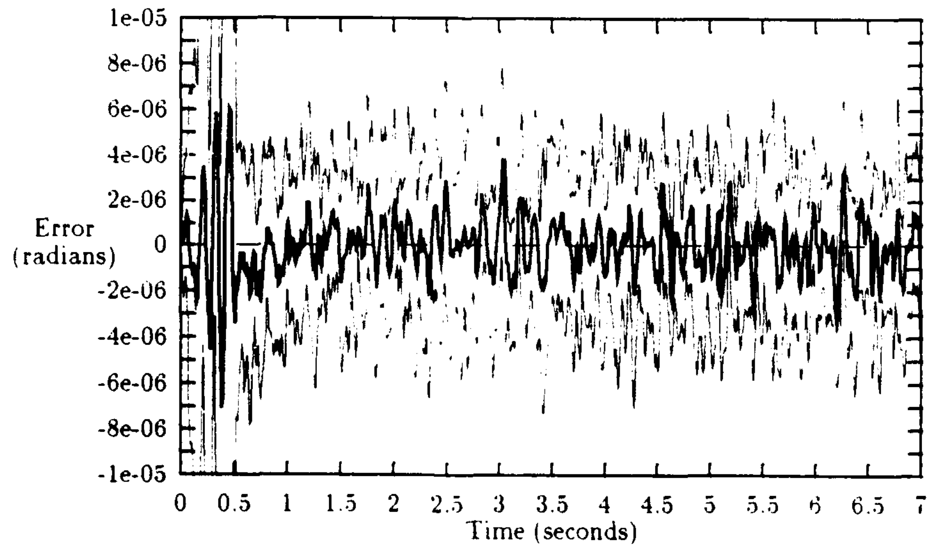

Figure 5.14. 60-State Filter Model versus 120-State Truth Model with Expanded **H** Matrix: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied (enlarged scale)

A third simulation was run to see the effects of tuning the white noise that the filter assumes to enter the structure directly. This resulted in tuning just the six disturbance white noise inputs that directly enter the structure, since the white noise inputs at the PMAs are shaped by the PMA dynamics. Figures 5.15 through 5.18 show the poor performance obtained by tuning the filter in this manner. Due to the performance of this case, no simulation was run with the expanded **H** matrix.

5.2.5 *Section Review* A summary of the results for this section is illustrated best in Table 5.1. This table lists the temporal average of the LOS RMS deviations for the four "insight" cases discussed. The temporal average is computed from the four-second point to the end of the run since control is not applied until the 0.5 second point of the run. "No Control" refers to the open loop simulation. "Original" refers to the closed loop simulation with accelerometers output providing the only measurements. "Expanded" refers to the closed loop simulation implementing the measurement matrix that provides accelerometer measurements along with relative position and relative velocity measurements of each PMA mass with the structure, and "Special" refers to the closed loop system with tuning of the white noise entering the structure directly. All the dynamics driving noise strength matrices and controller weights as described in Section 4.4.1 for these filter models and future filter models are given in Appendix E.

Table 5.1. LOS Temporal-Average RMS Deviations for 60-State Filter Model versus 120-State Truth Model

Configuration	X-Axis Deviation	Y-Axis Deviation
No Control	$> 20\ \mu$ rads	$> 20\ \mu$ rads
Original **H**	$3.81\ \mu$ rads	$3.70\ \mu$ rads
Expanded **H**	$3.64\ \mu$ rads	$3.63\ \mu$ rads
Special	$9.47\ \mu$ rads	$11.16\ \mu$ rads

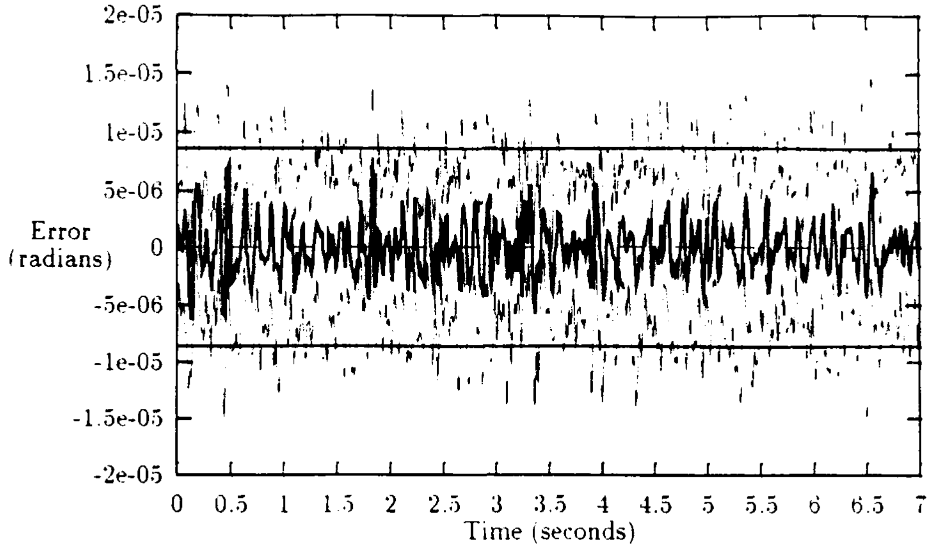

Figure 5.15. 60-State Filter Model versus 120-State Truth Model Direct Structure Tuning: X-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

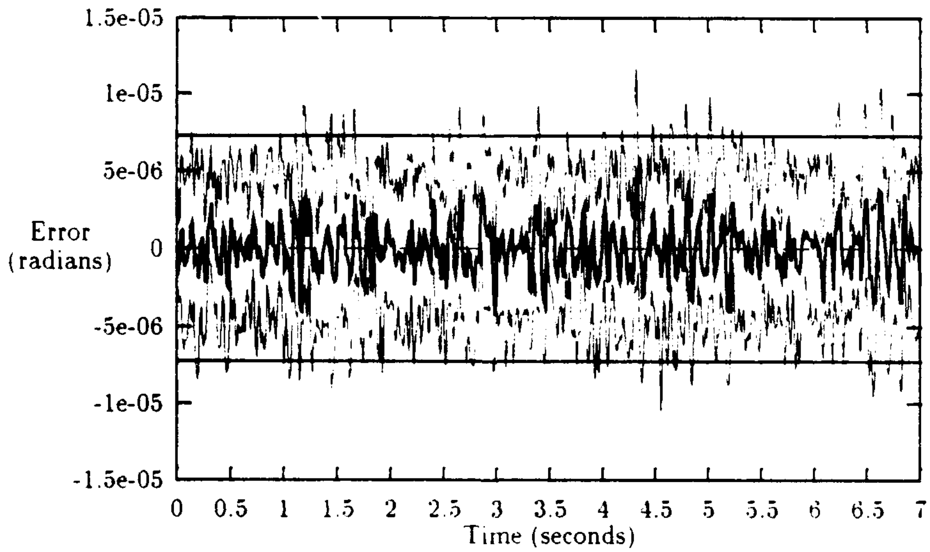

Figure 5.16. 60-State Filter Model versus 120-State Truth Model Direct Structure Tuning: Y-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

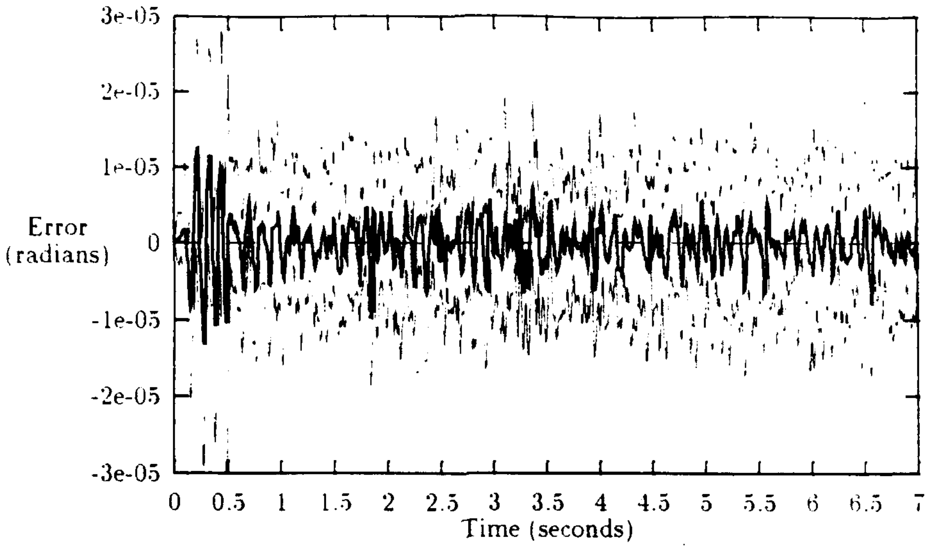

Figure 5.17. 60-State Filter Model versus 120-State Truth Model Direct Structure Tuning: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

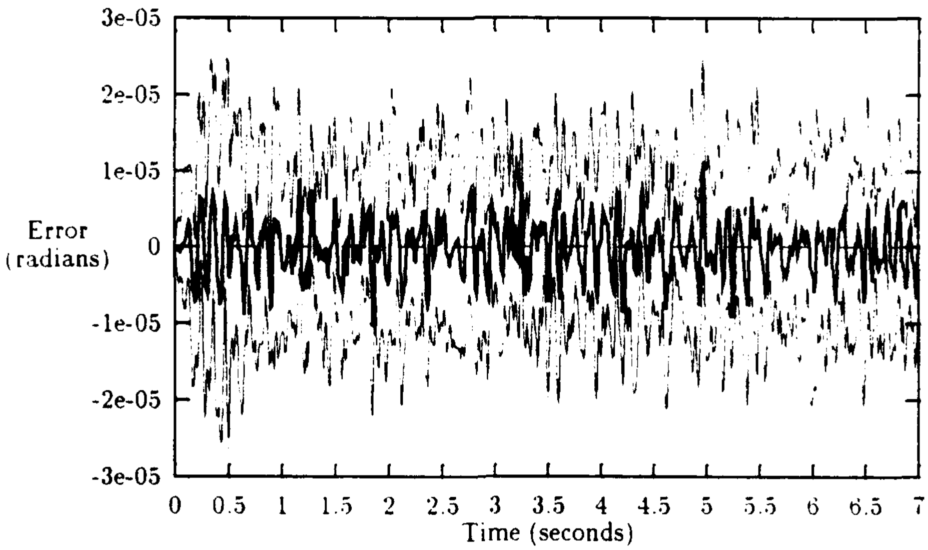

Figure 5.18. 60-State Filter Model versus 120-State Truth Model Direct Structure Tuning: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

5.3 Model Analysis

In this section, the results of tuned filter models and LQG controllers will be presented. The temporal average of each system's true error mean $\pm$ one standard deviation in the X and Y axes is presented in Table 5.2 at the end of this section. on page 5-30.

5.3.1 Full-Order Structure Model. This portion of the study examined the performance of the 134-state filter model against the 194-state truth model. The filter model has the same structure states as the truth model. with the difference in the overall state dimension due to the replacement of the colored noise in the truth model with white noise in the filter/controller design model.

The simulation results for this case using the original **H** matrix are depicted in Figures 5.19 through 5.24. From Figures 5.22 and 5.24. it can be seen that the LOS one micro-radian LOS deviation specification is not met. This observation is corroborated by the temporal average values of 4.38 micro-radian deviation in the X-axis and 4.87 micro-radian deviation in the Y-axis. These results need to be improved; thus a simulation using the expanded **H** matrix was executed. The results from this simulation are depicted in Figures 5.25 through 5.30. The use of the expanded measurement matrix has improved the deviations as seen in Figures 5.27 and 5.29. The temporal average for the X-axis and Y-axis RMS deviations are 3.66 micro-radians and 3.93 micro-radians, respectively. This corresponds to a 16.5 percent and 19.5 percent decrease in the X-axis and Y-axis LOS deviations. respectively. from the preceding case without position and velocity measurements. Note. for later simulation comparisons. the "clamping down" of the LOS deviations (see Figures 5.21, 5.22, 5.27 and 5.29) after control was applied at 0.5 seconds. Also. comparing Figure 5.19 to Figure 5.22. and Figure 5.20 to Figure 5.30. illustrates that the RMS deviations are very close to the RMS estimation errors. This implies that the controller is a very "tight" controller. suppressing structure oscillations to the level of accuracy of estimating those deviations.

5.3.2 Analysis of Modal Reduced Structure Models. This subsection discusses the results of the tuned filters consisting of the 12-state and 6-state modal reduced structure models discussed in Chapter 3.

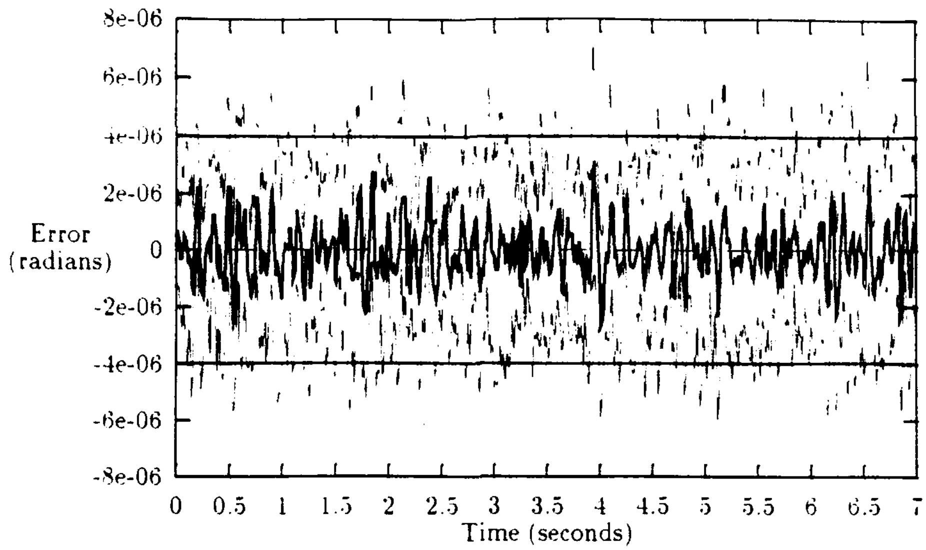

Figure 5.19. 134-State Filter Model versus 194-State Truth Model: X-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

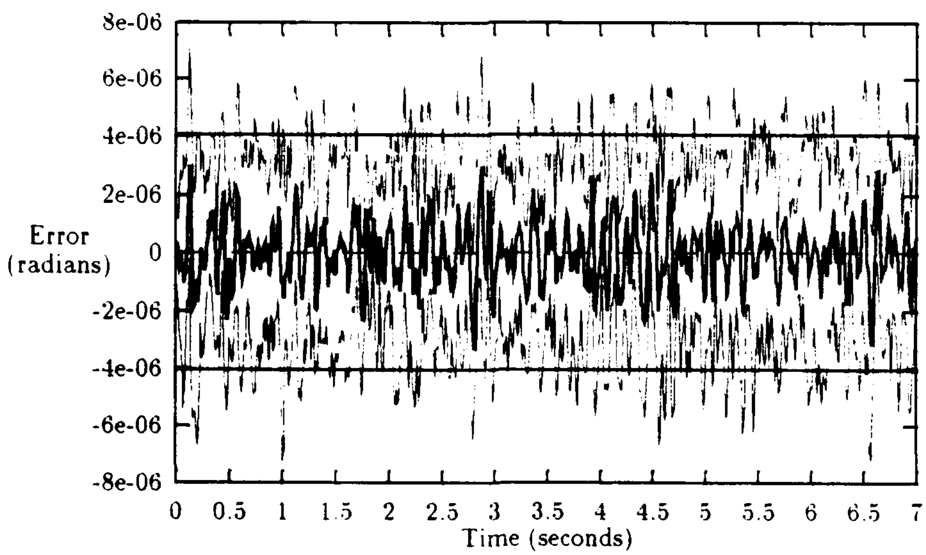

Figure 5.20. 134-State Filter Model versus 194-State Truth Model: Y-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

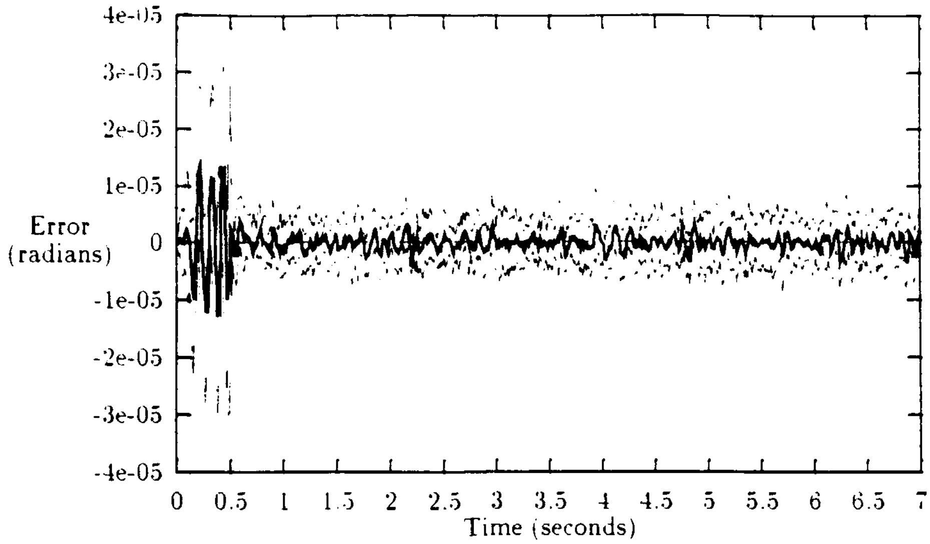

Figure 5.21. 134-State Filter Model versus 194-State Truth Model: X-Axis LOS Error Mean ± One Sigma with Control Applied

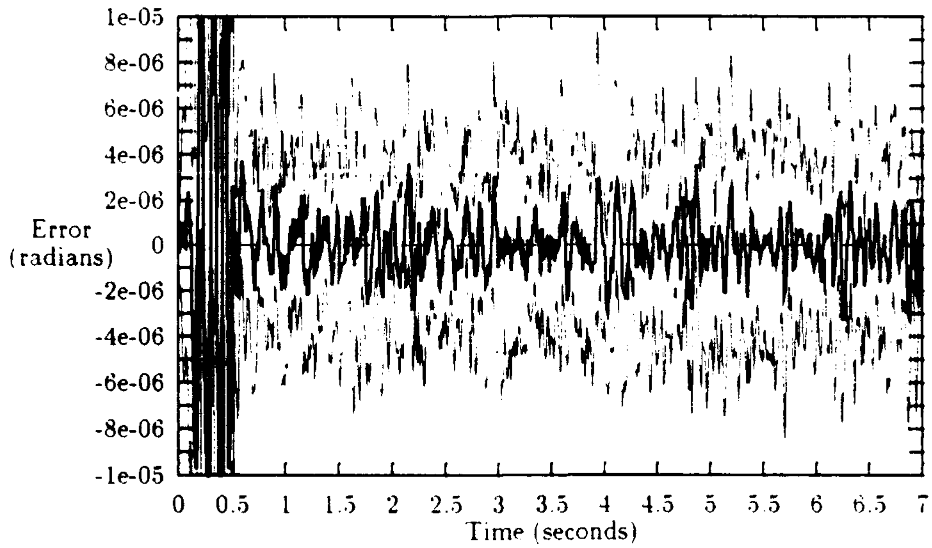

Figure 5.22. 134-State Filter Model versus 194-State Truth Model: X-Axis LOS Error Mean ± One Sigma with Control Applied (enlarged scale)

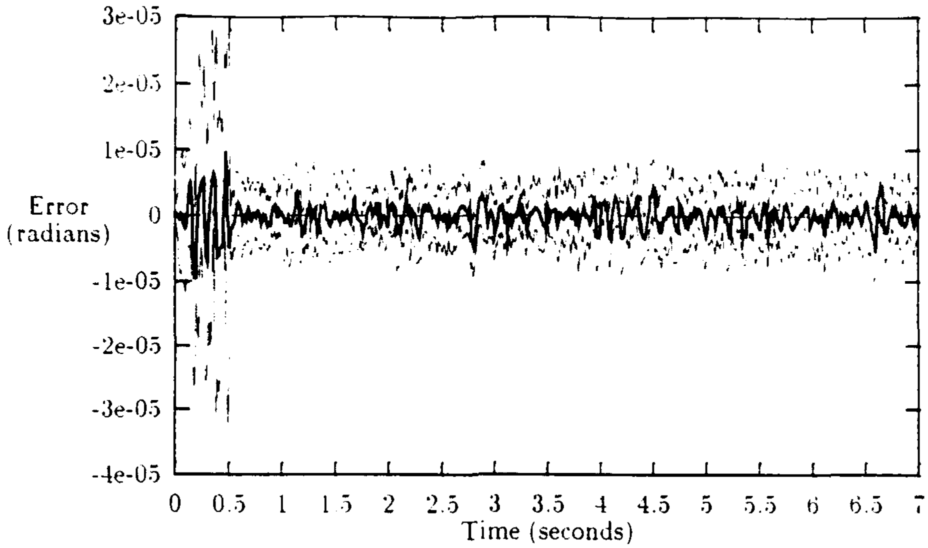

Figure 5.23. 134-State Filter Model versus 194-State Truth Model: Y-Axis LOS Error Mean ± One Sigma with Control Applied

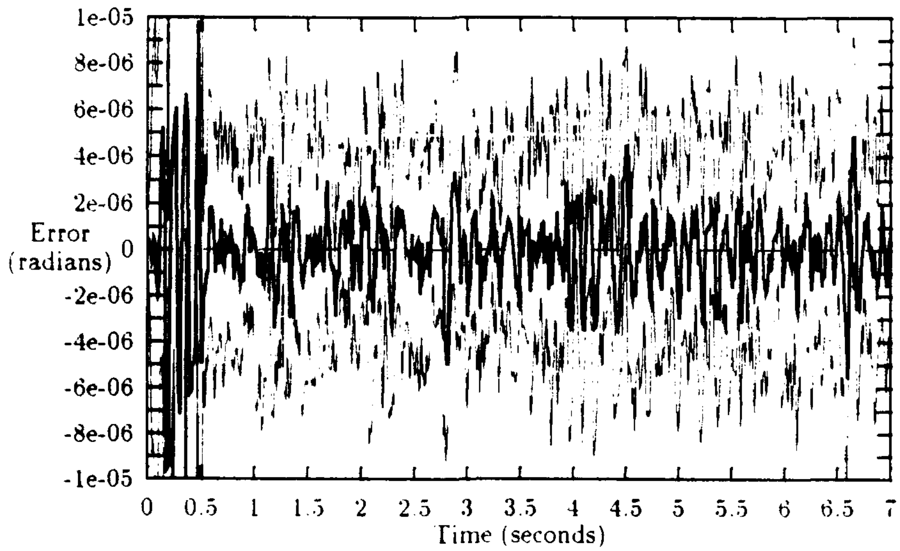

Figure 5.24. 134-State Filter Model versus 194-State Truth Model: Y-Axis LOS Error Mean ± One Sigma with Control Applied (enlarged scale)

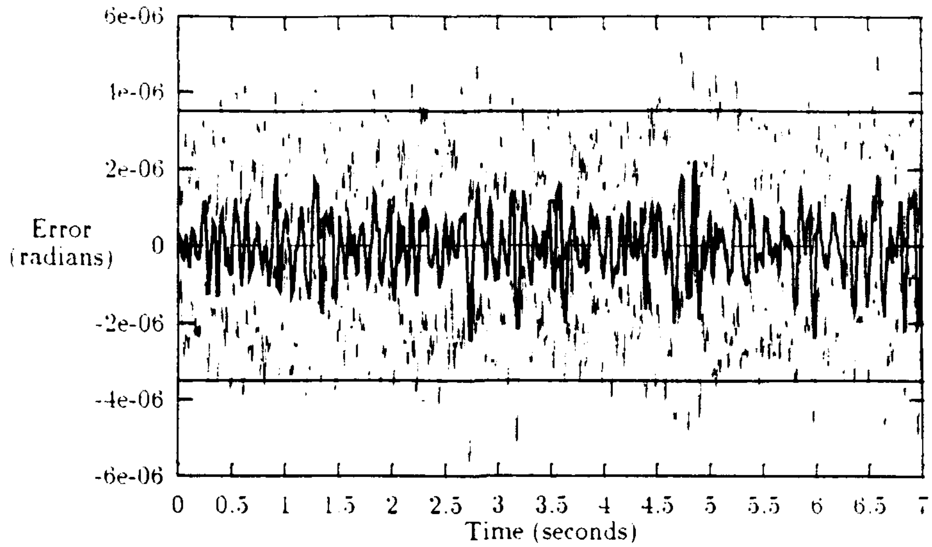

Figure 5.25. 134-State Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

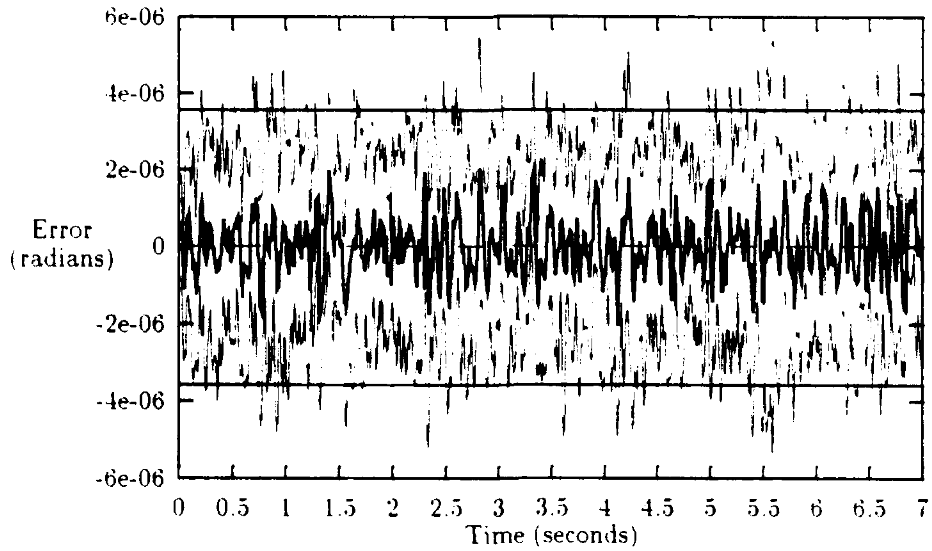

Figure 5.26. 134-State Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

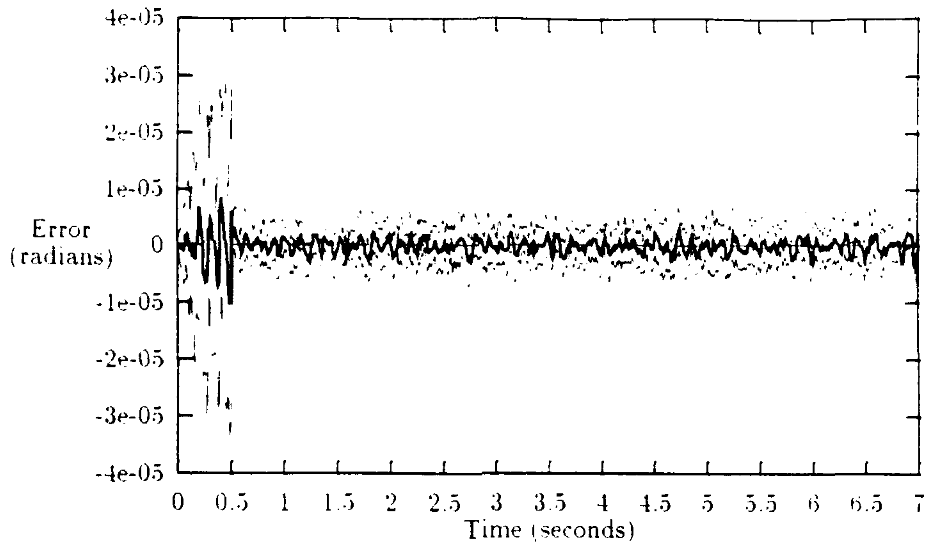

Figure 5.27. 134-State Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

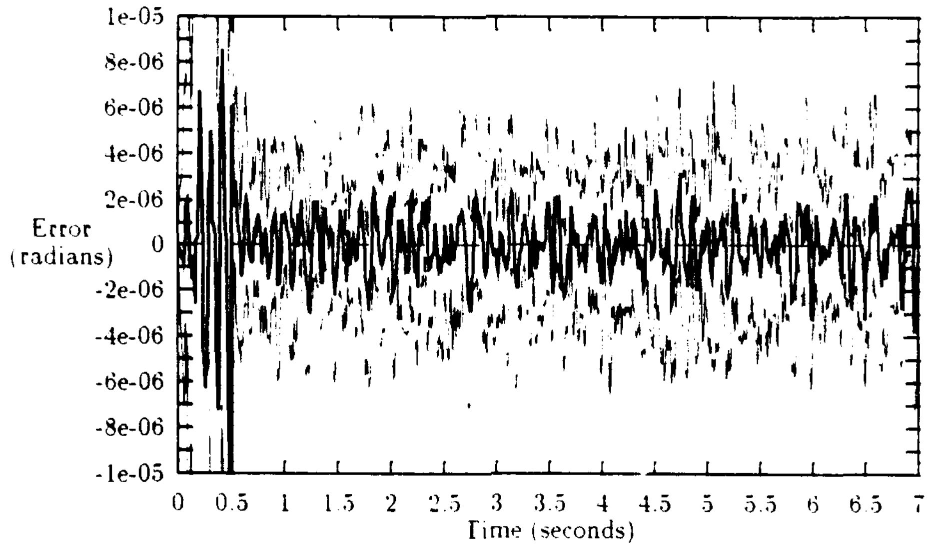

Figure 5.28. 134-State Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied (enlarged scale)

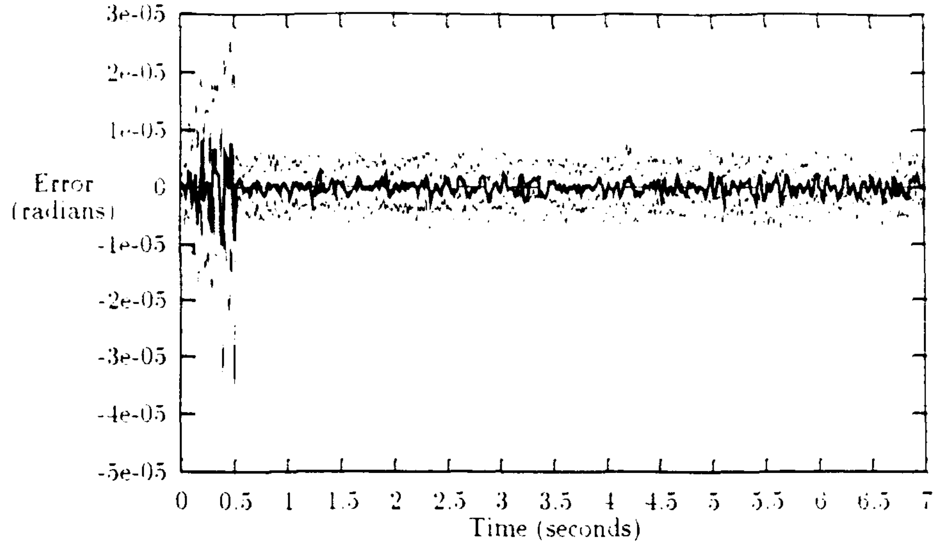

Figure 5.29. 134-State Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

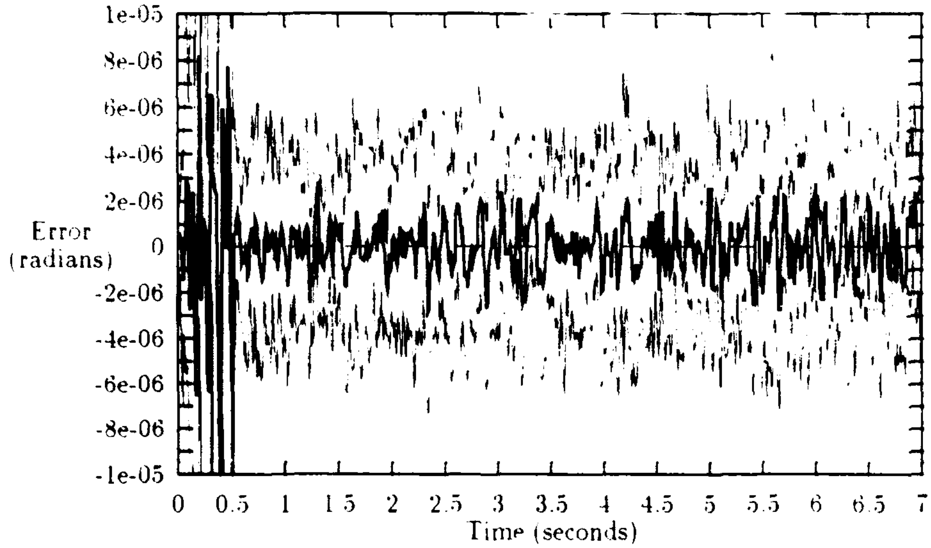

Figure 5.30. 134-State Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied (enlarged scale)

5.3.2.1 12-State Modal Reduced Structure Model. This case involved the 66-state modal reduced filter model (12-state structure) and the 194-state truth model. Examining the plots of the simulation with the original **H** matrix (Figures 5.31 through 5.34) and the expanded **H** matrix (Figures 5.35 through 5.38), using the expanded measurement matrix did not improve the results as in the previous cases: this is supported by the temporal average of the LOS RMS deviations. The X-axis and Y-axis LOS temporal average deviation implementing the original **H** matrix are 21.88 micro-radians and 22.76 micro-radians. the X-axis and Y-axis LOS temporal average deviation using the expanded **H** matrix are 21.26 micro-radians and Y-axis is 23.41 micro-radians. respectively. Figures 5.33. 5.34. 5.37 and 5.38 illustrate the inability of the controller to apply proper control using the inadequate estimates of the filter. i.e.. the lack of any clamping effect at the 0.5 second mark. Examining the dynamics driving noise of both tuned filters (see Appendix E). the high values indicate a very weak confidence level in the filter's estimations. Also the values of the state control weight. ρ_x. for the state weighting matrix decreased. thus reducing the "importance of maintaining individual state component deviations at small values" [22:11].

5.3.2.2 6-State Modal Reduced Structure Model. For this case. the 60-state filter model versus the 194-state truth model. very poor results were expected after seeing the results of Section 5.3.2.1. Figures 5.39 through 5.46 verify expectations. Temporal averages on the order of 21 micro-radians were attained from simulation runs involving the original and expanded measurement matrix. The extremely poor results in the LOS deviations are a direct result of not "clamping down" the LOS deviations by the controller. the small magnitude of the weight for the state weighting matrix and the large dynamics driving noise strength values.

5.3.3 Internally Balanced Reduced Order Structure Model. This section will present the 12-state internally balanced reduced order structure model. The 14-state and 6-state internally balanced reduced order structure models were not examined due to the inferior results of the 12-state model.

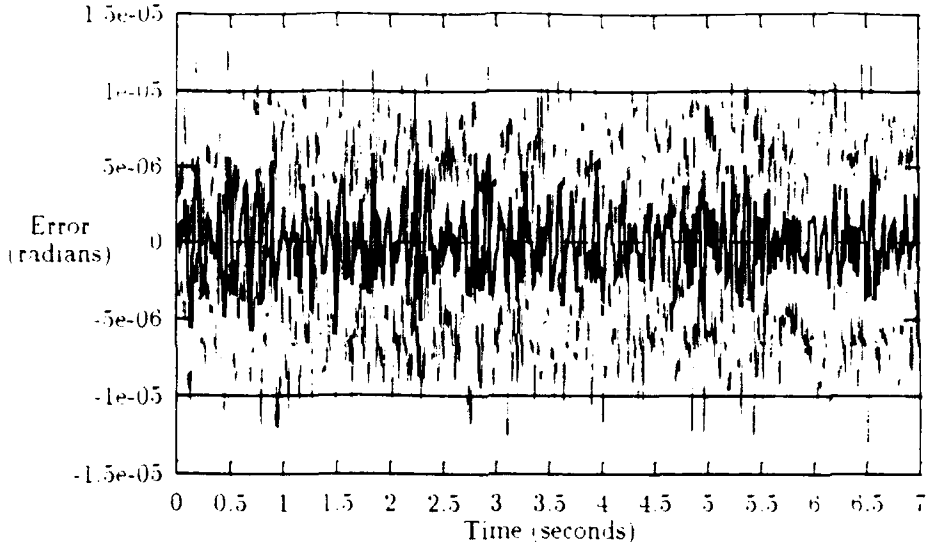

Figure 5.31. 66-State Modal Reduced Filter Model versus 194-State Truth Model: X-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

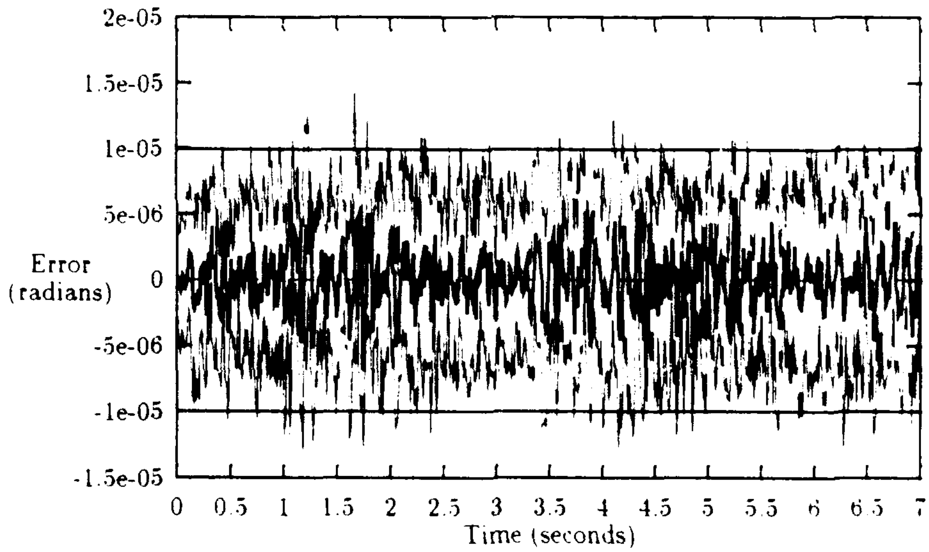

Figure 5.32. 66-State Modal Reduced Filter Model versus 194-State Truth Model: Y-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

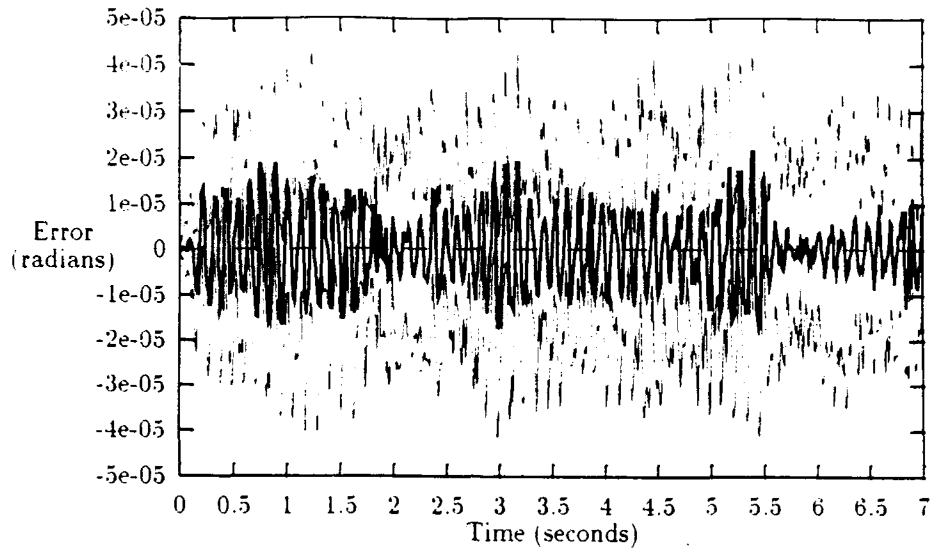

Figure 5.33. 66-State Modal Reduced Filter Model versus 194-State Truth Model: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

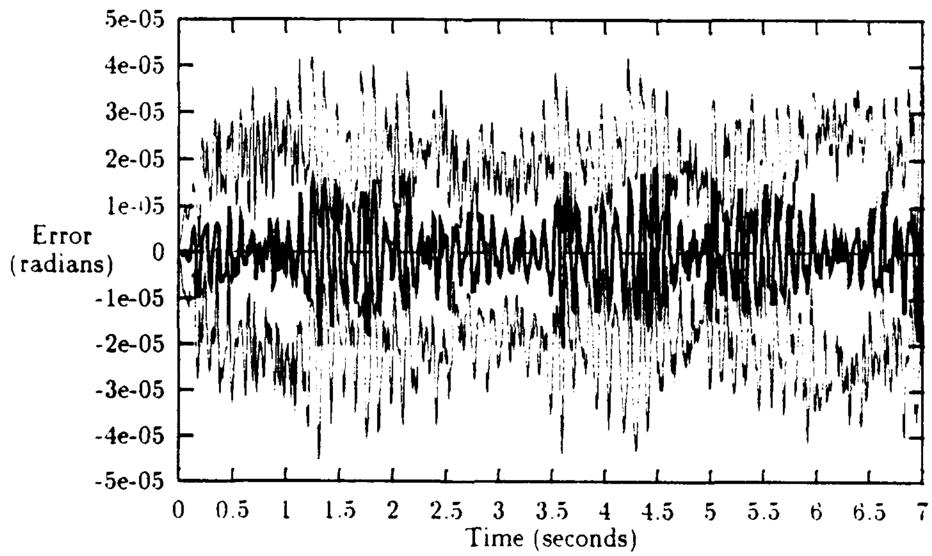

Figure 5.34. 66-State Modal Reduced Filter Model versus 194-State Truth Model: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

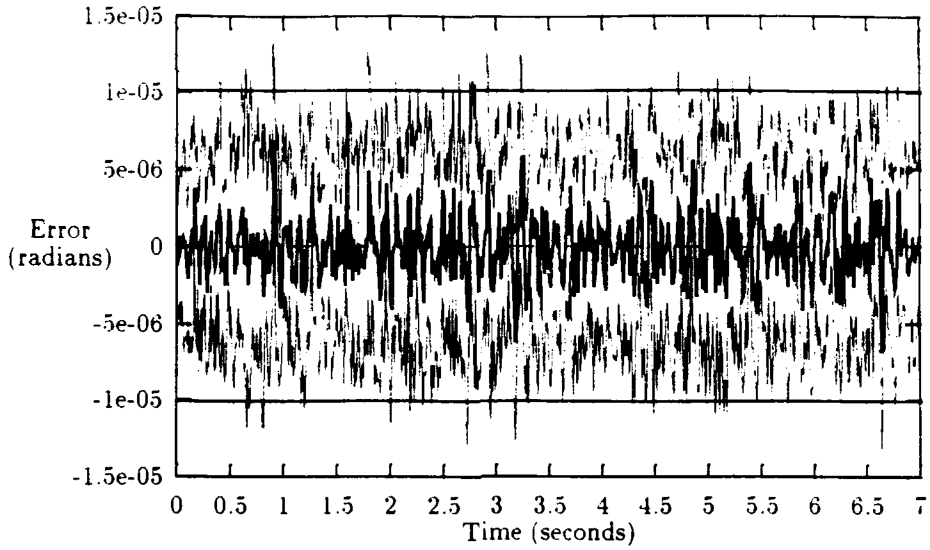

Figure 5.35. 66-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

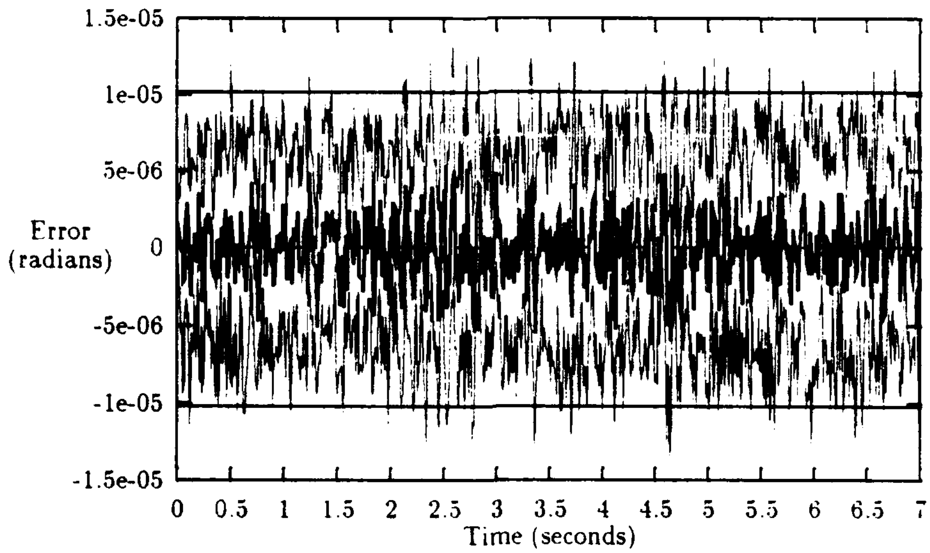

Figure 5.36. 66-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

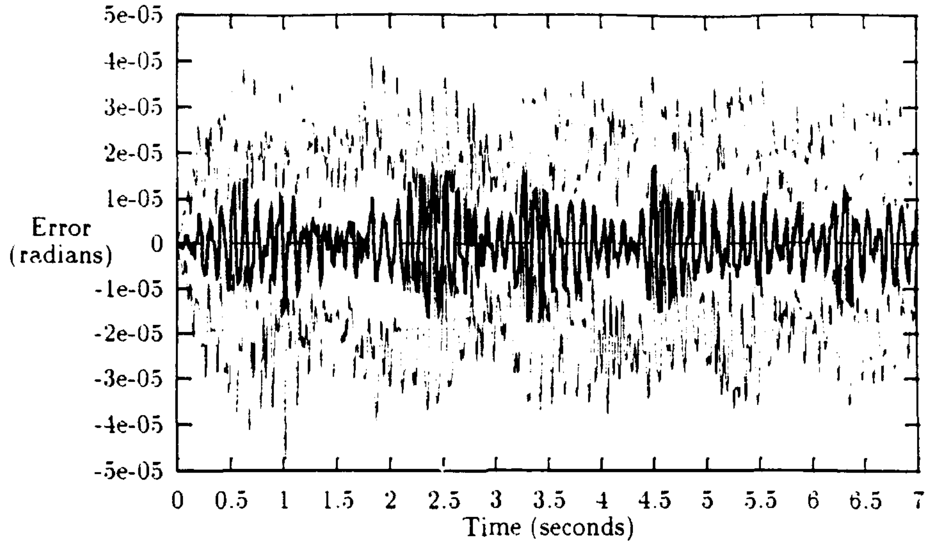

Figure 5.37. 66-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

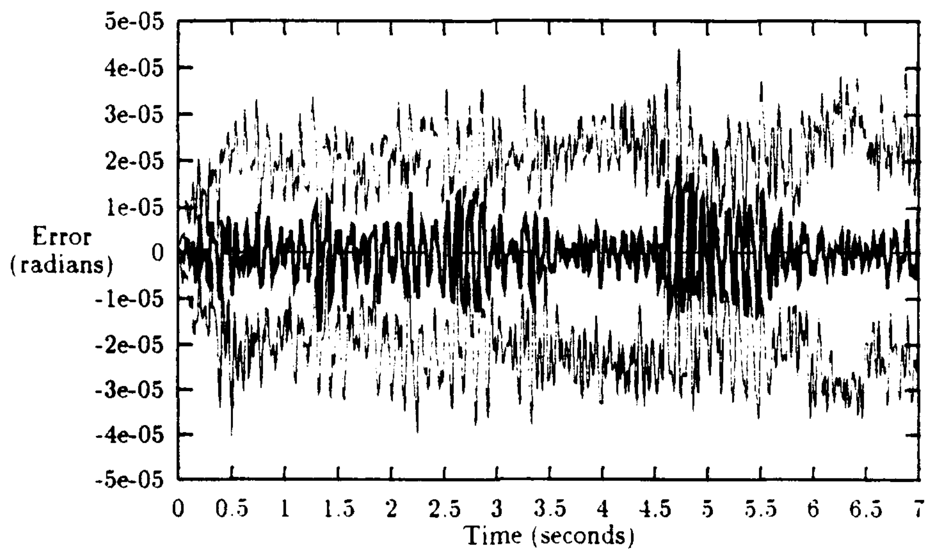

Figure 5.38. 66-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

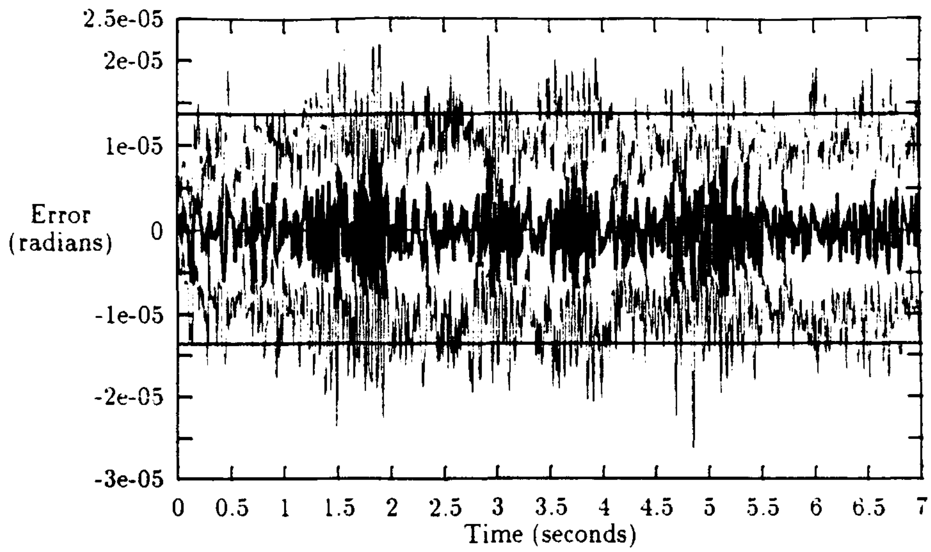

Figure 5.39. 6-State Modal Reduced Filter Model versus 194-State Truth Model: X-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

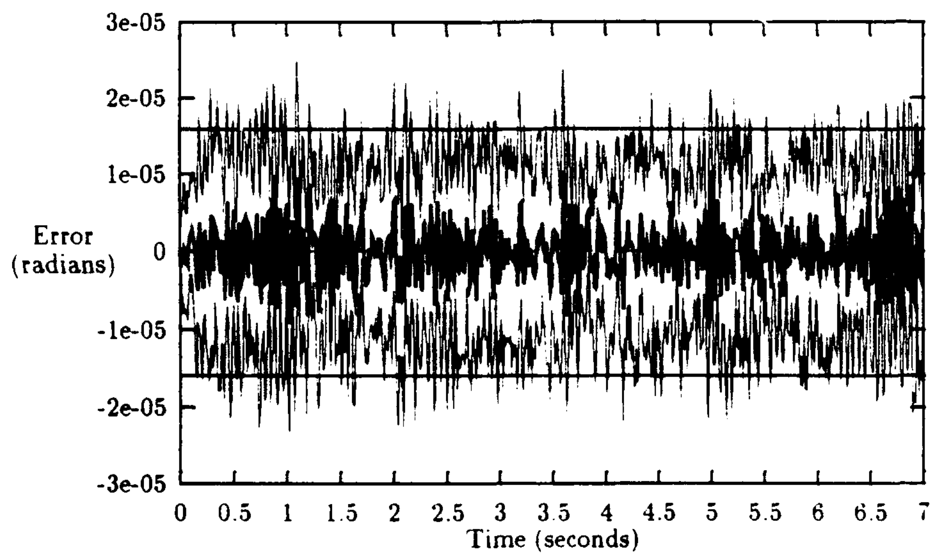

Figure 5.40. 6-State Modal Reduced Filter Model versus 194-State Truth Model: Y-Axis True Error Mean ± One Sigma and ± Filter Error One Sigma (horizontal lines)

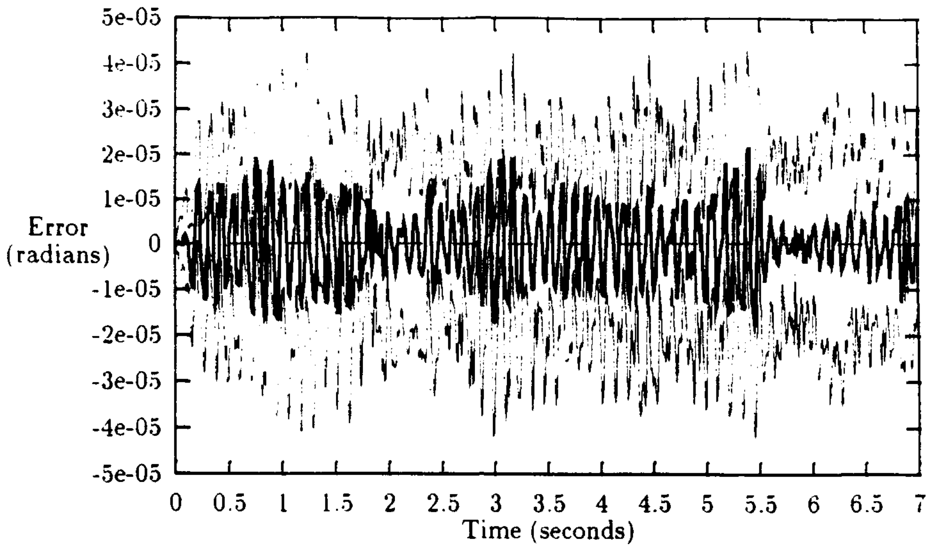

Figure 5.41. 6-State Modal Reduced Filter Model versus 194-State Truth Model: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

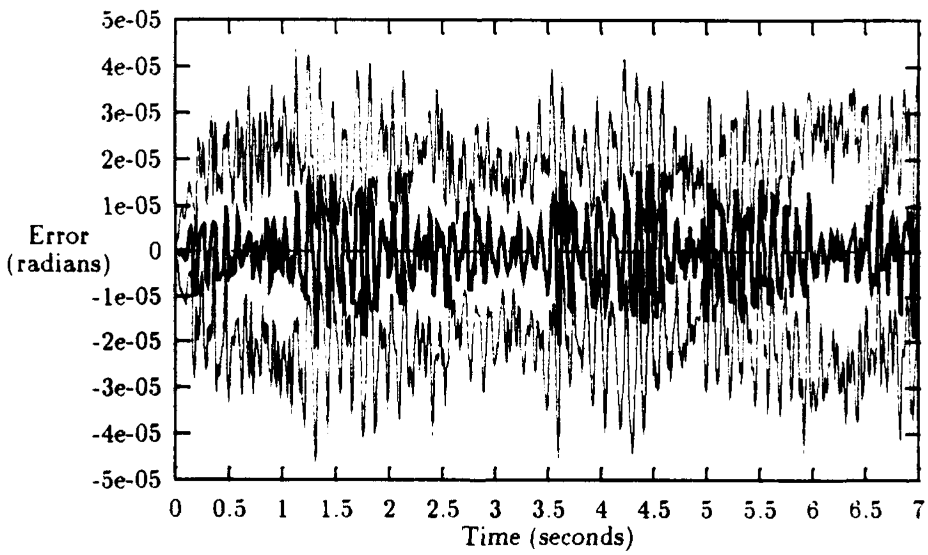

Figure 5.42. 6-State Modal Reduced Filter Model versus 194-State Truth Model: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

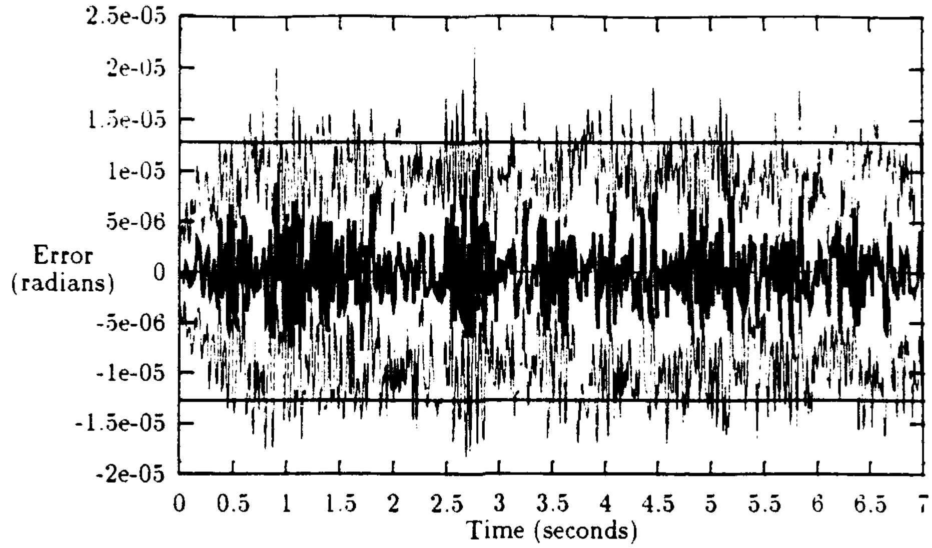

Figure 5.43. 6-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

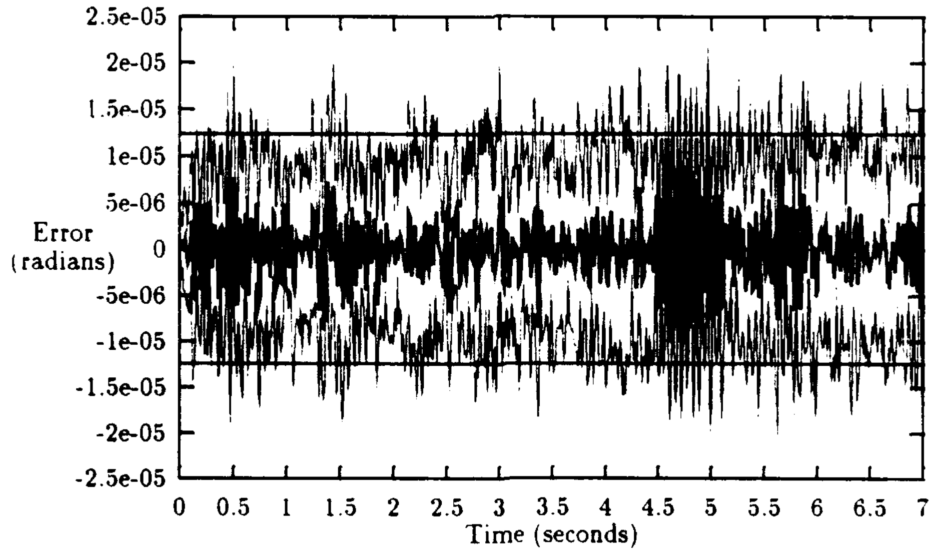

Figure 5.44. 6-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

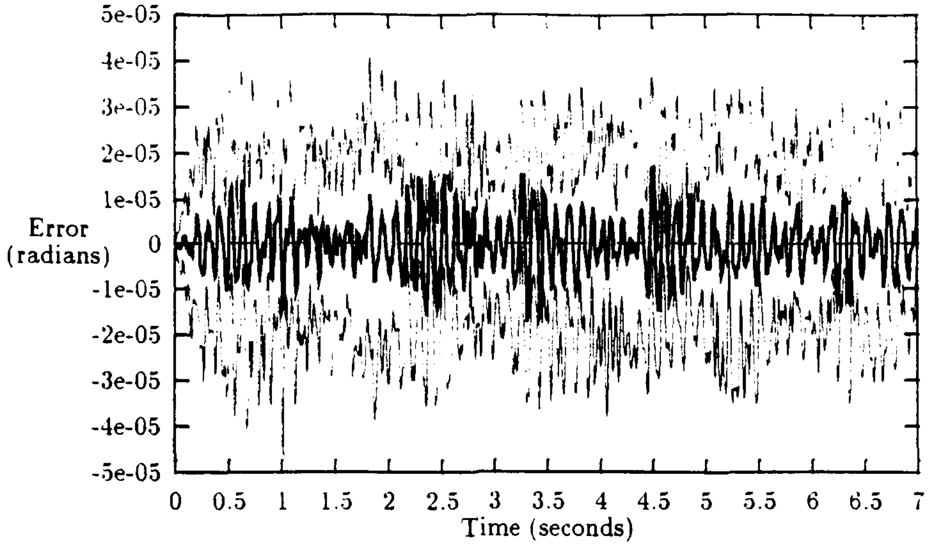

Figure 5.45. 6-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis LOS Error Mean ± One Sigma with Control Applied.

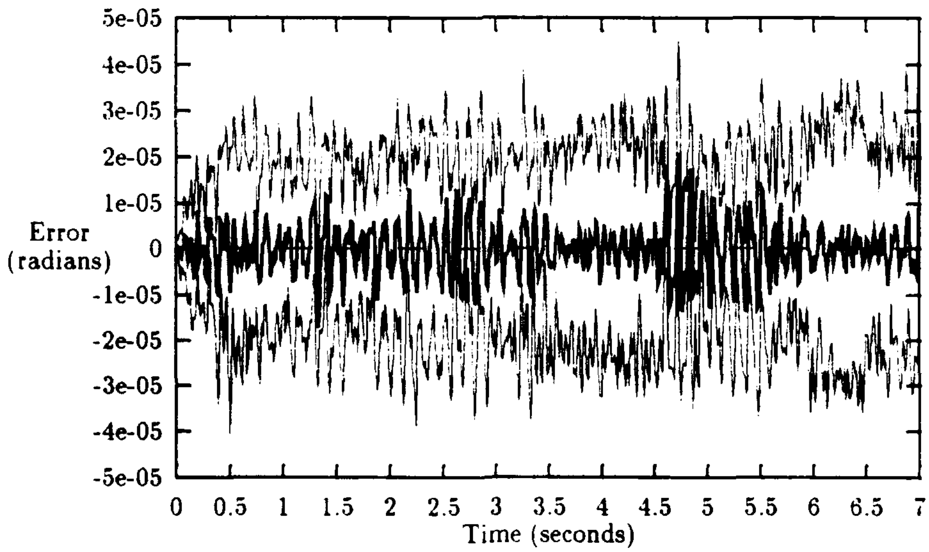

Figure 5.46. 6-State Modal Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis LOS Error Mean ± One Sigma with Control Applied

This 66-state filter performed poorly when the original measurement matrix was implemented (see Figures 5.47 through 5.50). The temporal average indicated that the X-axis LOS deviation RMS is 24.30 micro-radians and the Y-axis LOS deviation RMS is 26.01 micro-radians. The most significant reason for this is the huge dynamics driving noise required to tune the filter (see Appendix E). This noise strength indicates that there is absolutely no confidence in the filters' state estimates.

The results of the filter model implementing the expanded measurement matrix were not much better than the simulation using the original **H**, as seen in Figures 5.51 through 5.54. The temporal average of the X- and Y-axis LOS are 22.95 micro-radians and 25.08 micro-radians, respectively.

5.3.4 Section Review The results of this section are illustrated best by Table 5.2. From this table, it can be seen that none of the filter models are capable of meeting the LOS RMS error specification. The filter implementing the full-order 80-state structure model displayed the best performance and this filter model will be implemented in the MMAC study. The temporal averages for the 66-state filter models and 60-state filter model are nearly equivalent. These values also correspond to the open-loop (no control applied) simulation ran in Section 5.2.4. Thus, the controller cannot apply appropriate control with these reduced-order filter models.

Table 5.2. LOS Temporal-Average RMS Deviations: Reduced Structure Filter Models versus 194-State Truth Model

Filter	Configuration	X-Axis Deviation	Y-Axis Deviation
Full Order	Original **H**	4.38 μ rads	4.88 μ rads
	Expanded **H**	3.66 μ rads	3.93 μ rads
66-State Modal	Original **H**	21.88 μ rads	22.76 μ rads
	Expanded **H**	21.26 μ rads	23.41 μ rads
66-State Balanced	Original **H**	24.30 μ rads	26.01 μ rads
	Expanded **H**	22.94 μ rads	25.08 μ rads
60-State Modal	Original **H**	21.97 μ rads	22.96 μ rads
	Expanded **H**	20.78 μ rads	22.82 μ rads

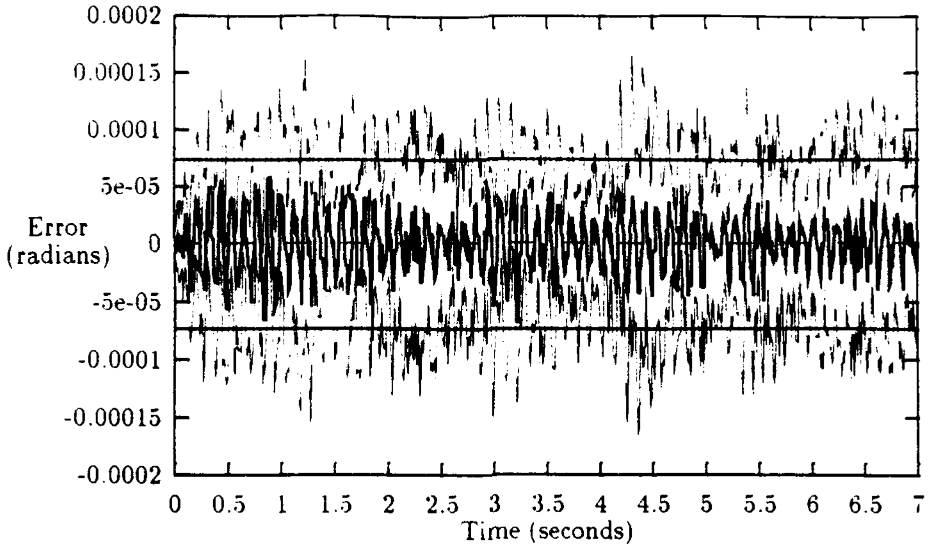

Figure 5.47. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model: X-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

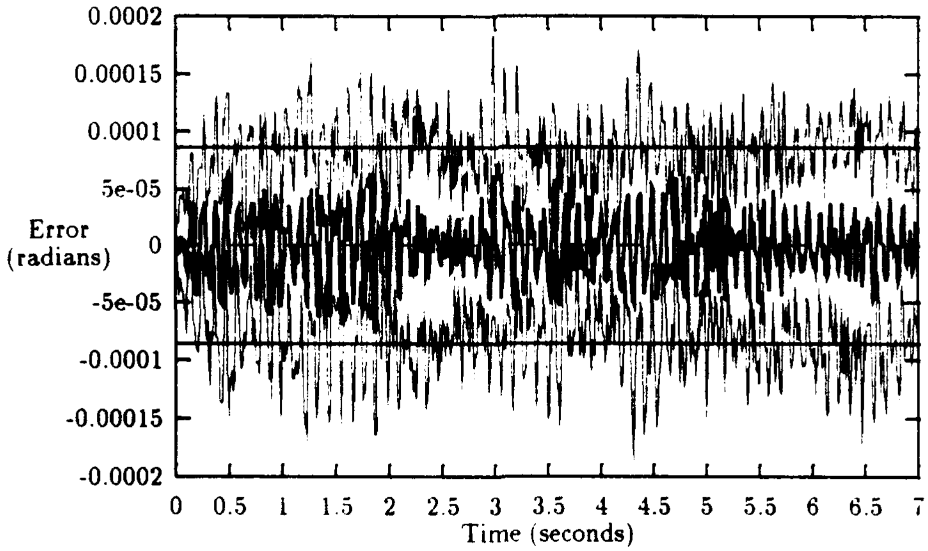

Figure 5.48. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model: Y-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

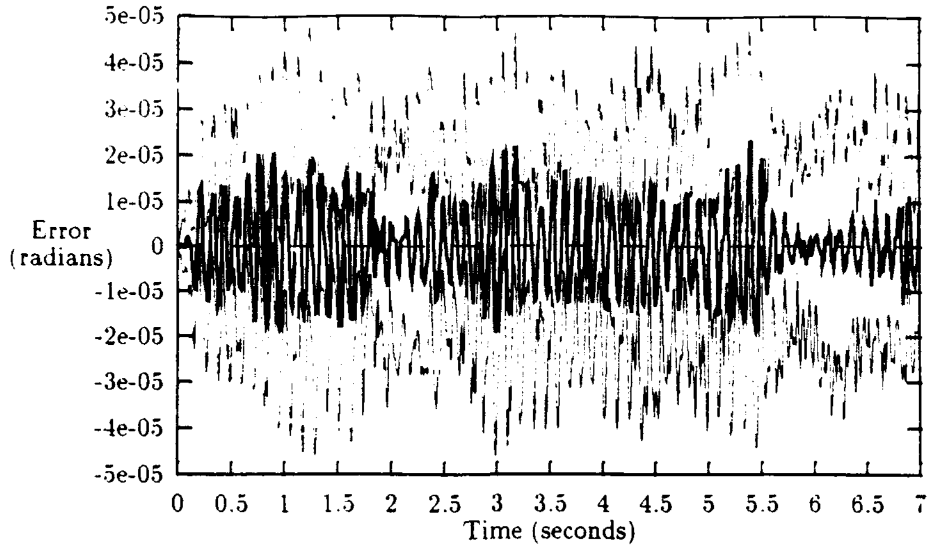

Figure 5.49. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

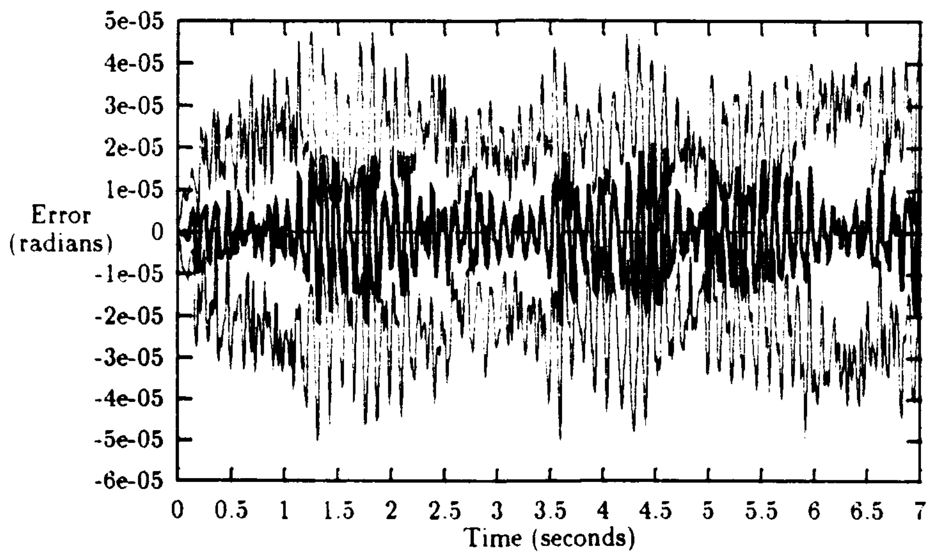

Figure 5.50. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

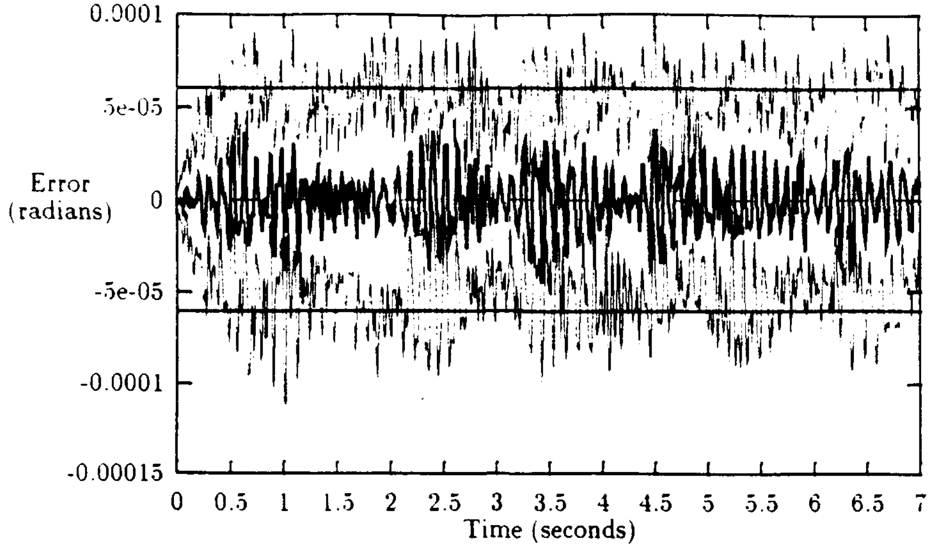

Figure 5.51. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

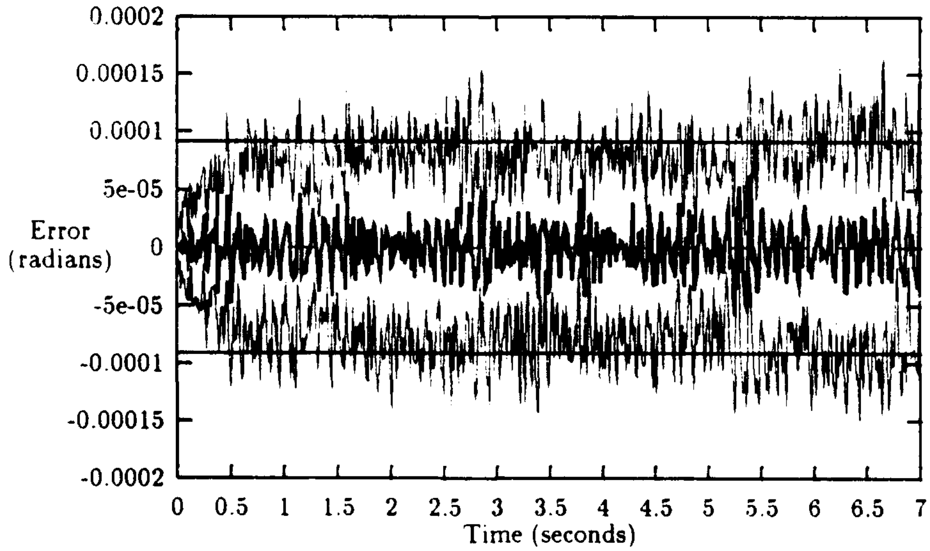

Figure 5.52. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis True Error Mean $\pm$ One Sigma and $\pm$ Filter Error One Sigma (horizontal lines)

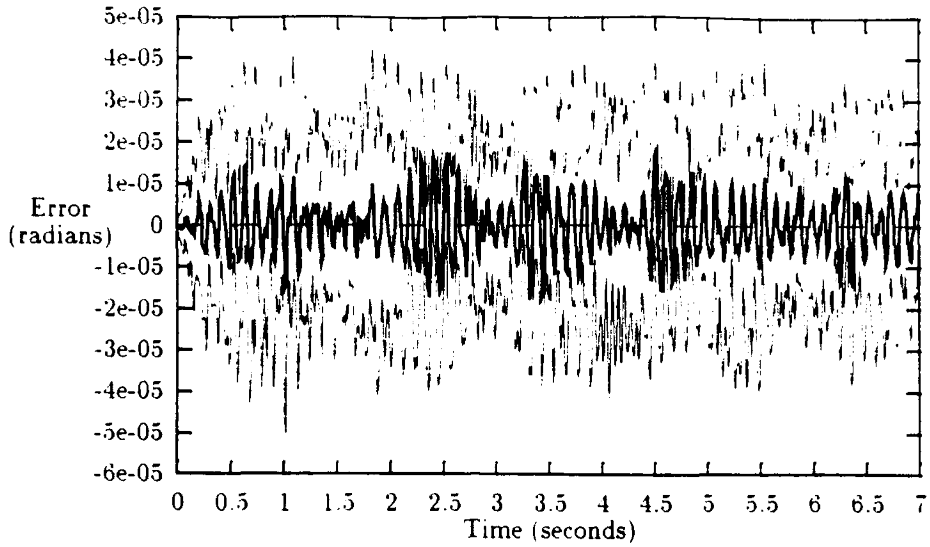

Figure 5.53. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: X-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

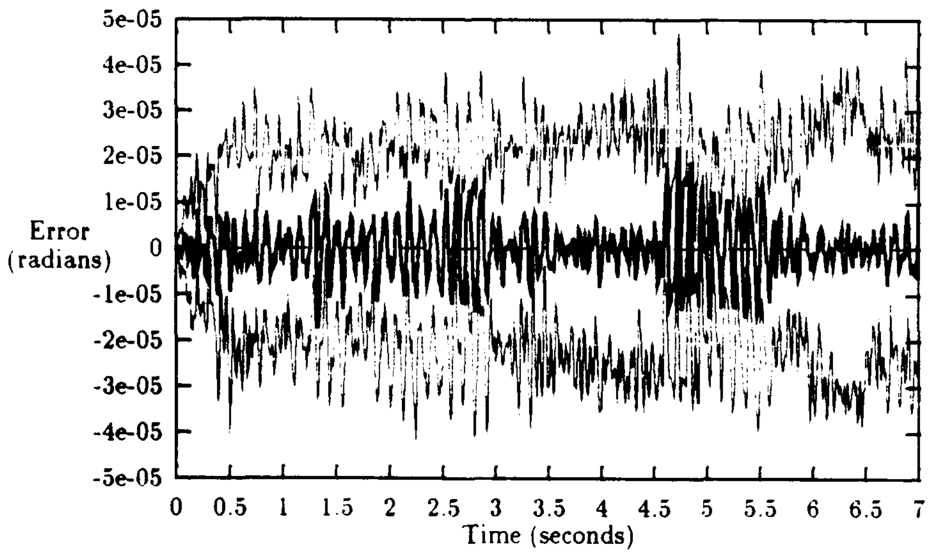

Figure 5.54. 66-State Internally Balanced Reduced Filter Model versus 194-State Truth Model with Expanded **H** Matrix: Y-Axis LOS Error Mean $\pm$ One Sigma with Control Applied

5.4 Discretization Of Parameter Space

The parameter space was divided up as presented in Section 4.4.4. The resulting discretization weights of the space are depicted in the following two tables. The discretization weights are multiplicative values which are used to define new parameter values in the discretized parameter space. All of the new parameter values are based from the nominal parameter values at the center of the parameter space. Table 5.3 illustrates that the system is very sensitive to variations in the undamped natural frequency: only very small increments in ω can be tolerated without causing closed-loop system instability. This sensitivity is a strong advocate for the use of MMAE/MMAC algorithms to quell oscillations introduced in the SPICE structure. Although this discretization encompasses a 6.5% variation in ω, a larger space could easily be developed using this fine discretization level. Table 5.4 illustrates the exact opposite of Table 5.3: the insensitivity of the system to variations in the damping ratio. This insensitivity to variations in ζ imply that only a one-dimensional space may be required yielding a MMAC algorithm that adapts to variations in ω but not to variations in ζ.

Table 5.3. ω Axis Discretization

Parameter	ω_1	ω_2	ω_3	ω_4	ω_5	ω_6	ω_7
Weight	0.9811	0.9860	0.9930	1.0000	1.0200	1.0333	1.0466

Table 5.4. ζ Axis Discretization

Parameter	ζ_1	ζ_2	ζ_3
Weight	0.01	1.0000	9.1

5.5.1 Introduction. This section will discuss the results of the parameter identification of the moving-bank multiple model algorithm. Other than the three-by-seven discretized parameter space, a second parameter space was developed and tested due to problems encountered with the three-by-seven parameter space. The second discretized parameter space implemented is a one-by seven parameter space. This space is the center row of the three-by-seven space, allowing adaptation to ω variations but using only a single nominal value of ζ. A more detailed reason for the second parameter space and results of tests will presented in this section. All parameter locations will be presented in accordance with Figure 4.2. The true and filter ζ parameters will always be ζ_2 and never vary. This is ultimately due to the insensitivity of the structure to parameter variations in damping ratio. Except for one case, parameter estimation implements the ME/I technique presented in Section 2.3. A test case implements a parameter estimation technique that considers the relative residual covariances between measurement devices; this will be explained later in detail. The bank move logic used is the parameter position monitoring technique discussed in Chapter 2. It also should be noted that effective parameter identification and bank movement don't take place until one second into the simulations. This attribute would not be envisioned for actual implimentation of the controller: this delay should be removed altogether, allowing an open-loop estimator to generate good state and parameter estimates (performing only bank moves necessary to do so) for the initial 0.5 seconds, at which time closed-loop control is initiated (closed-loop control should not be fed back into the system until good estimation performance is achieved). While examining the plots, it can be seen that there exists some definite "action" during the first second in cases where the initial truth model parameter and filter parameter started at the same value. The reason for this has been identified as a coding error due to not initializing storage some registers to zero. This oversight causes the MMAC algorithm to wait one second versus .5 seconds to apply control to the moving bank. This discrepancy does not effect the overall results of the study.

5.5.2 Three-by-Seven Discretized Parameter Space. The initial simulations set the true parameter at ω_4, at ω_2 and at ω_6, while the bank is initially centered about ω_4. The results of parameter identification with the true parameter and filter

bank initially at ω_4 are depicted in Figures 5.55 and 5.56. Figure 5.55 shows that the center of the bank and the parameter estimate (recall that the bank's parameter estimate is determined by Equation (1.5)) stay aligned with the true ζ parameter value. The omega axis plot, Figure 5.56, illustrates some confusion on the part of the parameter estimate and the location of the center of the bank. Although confusion exists, the center of the bank follows the parameter estimate very closely: this will be true for all parameter identification cases examined in this chapter.

The simulation in which the true parameter is set to ω_2, Figures 5.57 and 5.58, illustrates that the zeta parameter estimate and bank center remain at the true parameter value, and the omega parameter estimate is very poor. The parameter estimate and bank center are biased towards the proper parameter value from the initial value of ω_4, but the identification process never identifies the true parameter value. This is also true for the case where ω_6 is the true parameter value, as seen in Figures 5.59 and 5.60.

This inability to identify the correct parameter results in deviations of the initial plan as presented in Chapter 4. Examining the simulation code at particular variables, it was determined that the parameter estimation is attempting to move the bank in diagonal directions rather than simply in the ω direction. Given the 3-by-7 parameter space, the 3-by-3 moving bank of filters can only move in the ω direction. Thus two different tests have been developed to remove the move logic's desire to move the bank in a diagonal direction. Both tests limit the move direction choices of the bank to down the ω axis, up the ω axis and no movement in the ζ direction. The first test sums the residual values of each column in the bank and compares these three values to determine which way the bank moves. The second test extracts the middle row of the three-by-seven parameter space, thus creating a one-by-seven parameter space based solely upon the single nominal ζ value.

5.5.3 Three-by-Seven Discretized Parameter Space with Modified Move Logic. The same simulations ran previously are run with the modification made to the move logic. The results are illustrated in Figures 5.61 to 5.66. Figures 5.61, 5.63 and 5.65 illustrates that the true ζ parameter value is maintained, as expected (since the center of bank was forced to remain at the ζ_2 position). Figures 5.62, 5.64 and 5.66 depict a more pronounced trend to move the bank to the correct parameter value, compared to the results of Section 5.5.2. A larger variance is also detected in these plots. This increase in variance is unexplainable.

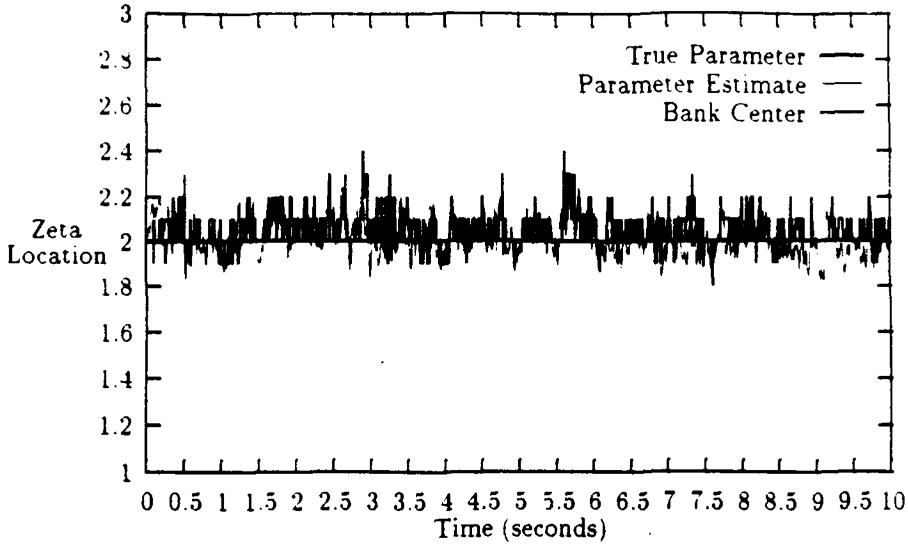

Figure 5.55. 3-by-7 Parameter Space: Initial True Parameter at [2,4] and Initial Filter Parameter at [2,4] - Zeta Response

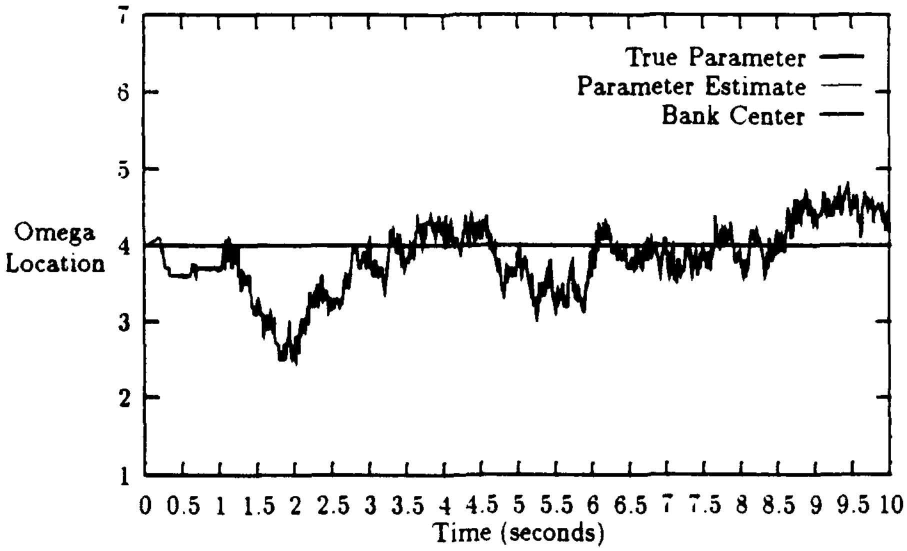

Figure 5.56. 3-by-7 Parameter Space: Initial True Parameter at [2,4] and Initial Filter Parameter at [2,4] - Omega Response

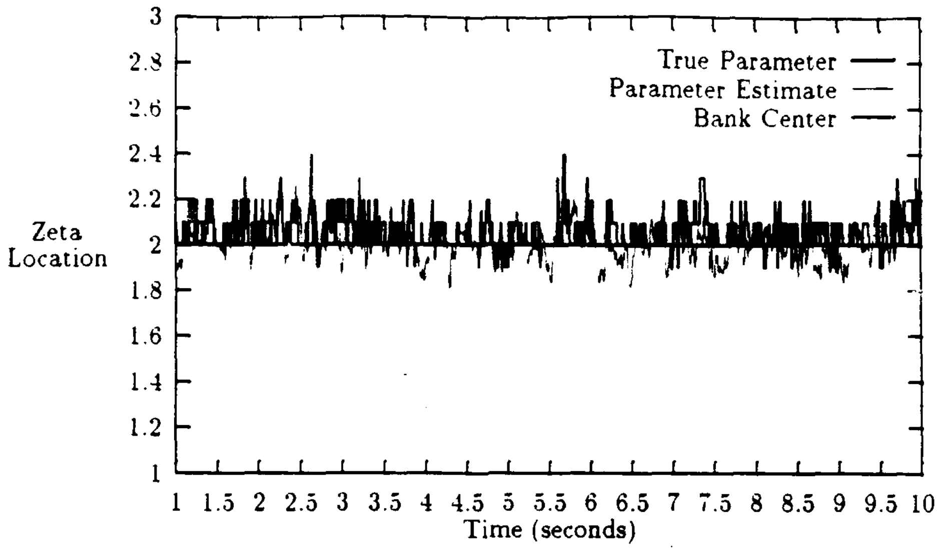

Figure 5.57. 3-by-7 Parameter Space: Initial True Parameter at [2,2] and Initial Filter Parameter at [2,2] - Zeta Response

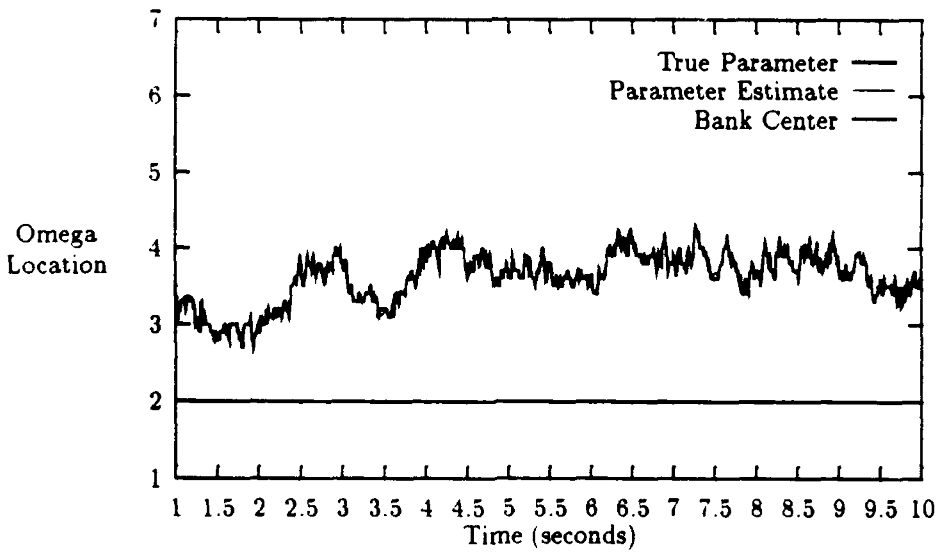

Figure 5.58. 3-by-7 Parameter Space: Initial True Parameter at [2,2] and Initial Filter Parameter at [2,2] - Omega Response

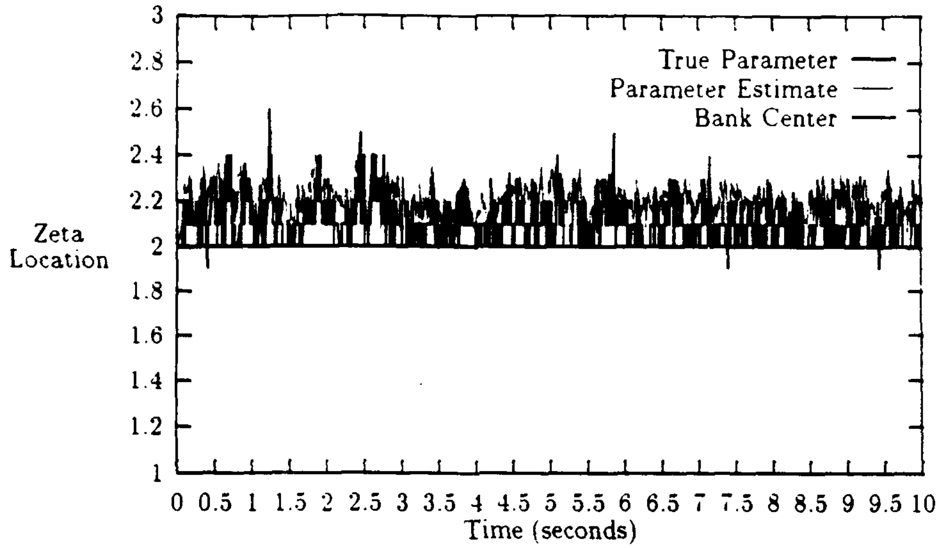

Figure 5.59. 3-by-7 Parameter Space: Initial True Parameter at [2,6] and Initial Filter Parameter at [2,6] - Zeta Response

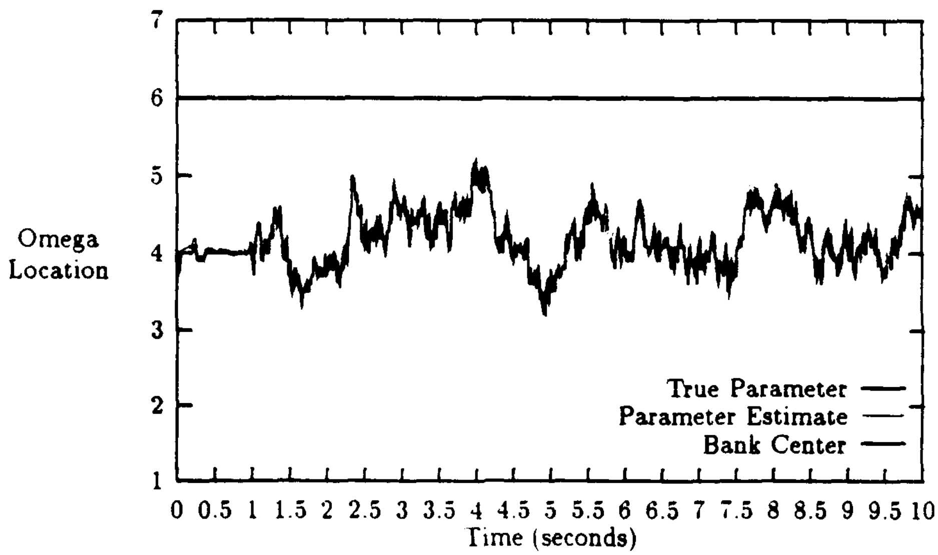

Figure 5.60. 3-by-7 Parameter Space: Initial True Parameter at [2,6] and Initial Filter Parameter at [2,6] - Omega Response

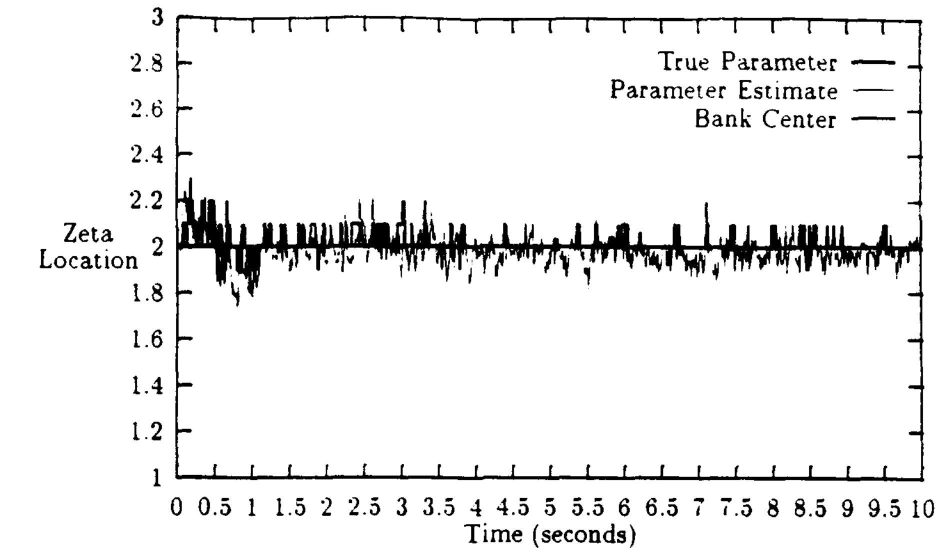

Figure 5.61. 3-by-7 Parameter Space Modified Move Logic: Initial True Parameter at [2,4] and Initial Filter Parameter at [2,4] - Zeta Response

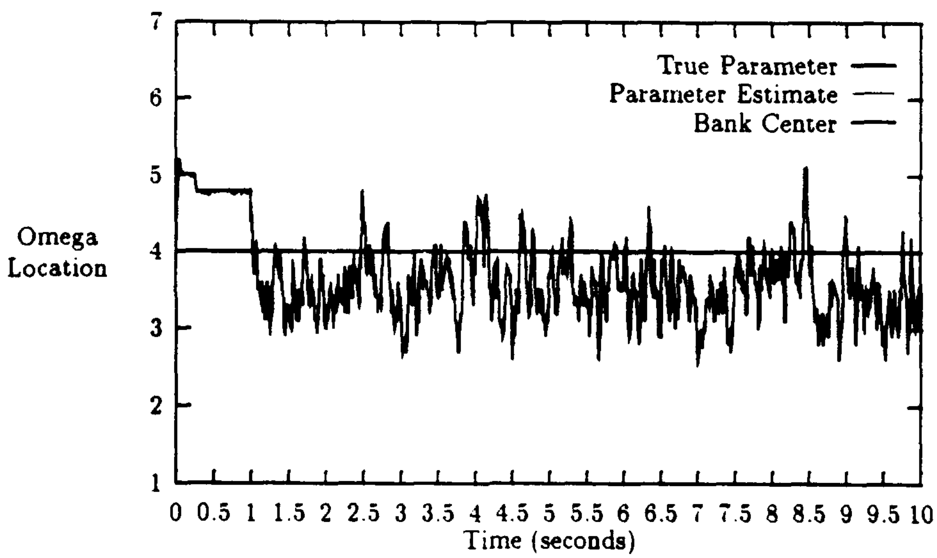

Figure 5.62. 3-by-7 Parameter Space Modified Move Logic: Initial True Parameter at [2,4] and Initial Filter Parameter at [2,4] - Omega Response

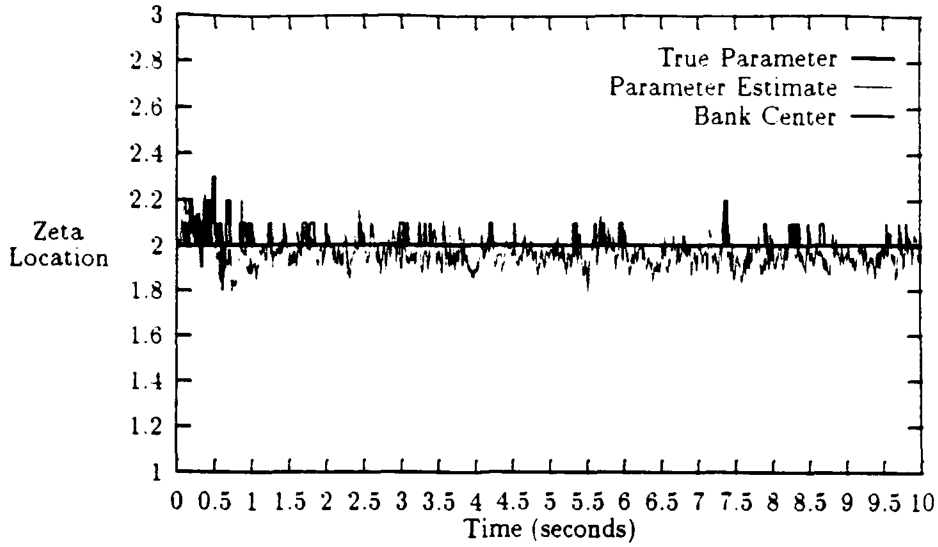

Figure 5.63. 3-by-7 Parameter Space Modified Move Logic: Initial True Parameter at [2,2] and Initial Filter Parameter at [2,2] - Zeta Response

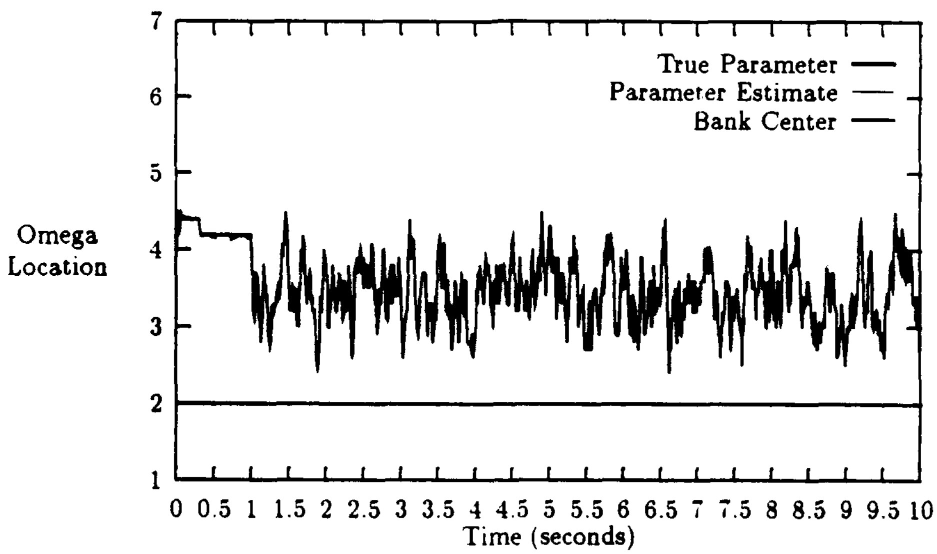

Figure 5.64. 3-by-7 Parameter Space Modified Move Logic: Initial True Parameter at [2,2] and Initial Filter Parameter at [2,2] - Omega Response

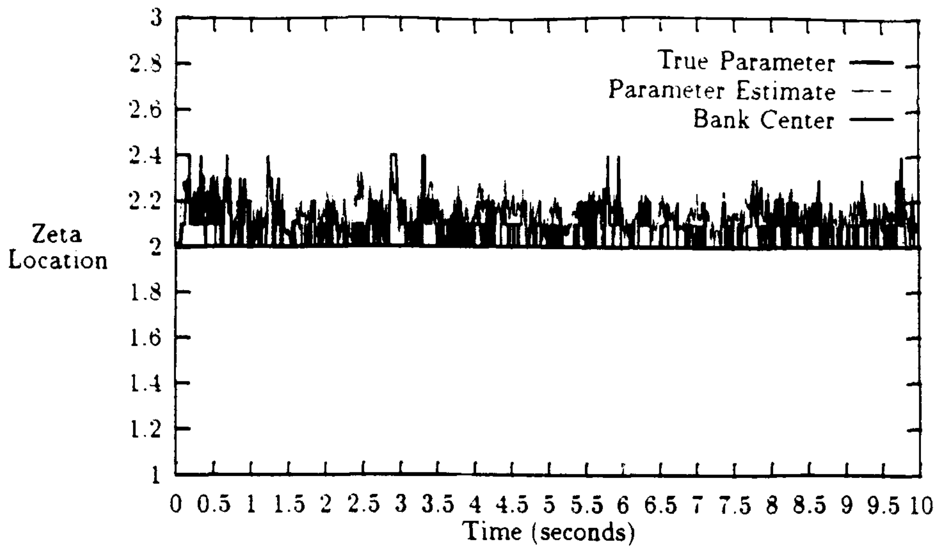

Figure 5.65. 3-by-7 Parameter Space Modified Move Logic: Initial True Parameter at [2,6] and Initial Filter Parameter at [2,6] - Zeta Response

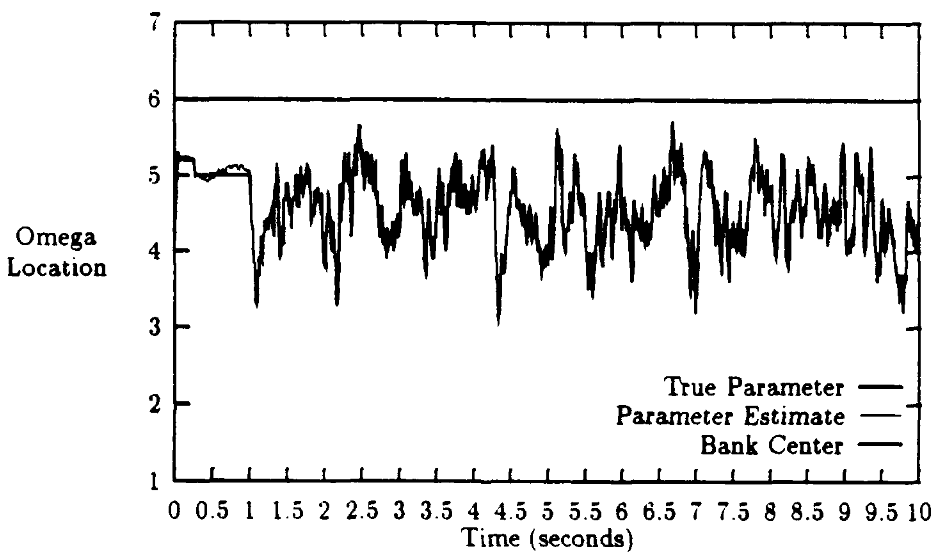

Figure 5.66. 3-by-7 Parameter Space Modified Move Logic: Initial True Parameter at [2,6] and Initial Filter Parameter at [2,6] - Omega Response

5.5.4 One-by-Seven Discretized Parameter Space. The simulations run for this space will only depict the ω axis plots since there is no ζ parameter variation in the space. Probability and control thresholds were modified to correspond to the decrease in the moving-bank size. The thresholds are used to avoid the "lock-out" condition discussed in Section 1.1.2 and numerical inaccuracy problems. To this point Moyle's [29] values have been employed. The lower bound on the probability threshold was changed from 0.05 to 0.20. The threshold is implemented due to numerical precision problems and is used to ensure "good" probability values for the three filters of the moving bank when executing the controller algorithm. The value of 0.20 was chosen by assuming that a condition exists where all three filters are equally probable of being correct: a probability of 0.33 for each. Obviously this condition can not exist since the three filters are in a "line" configuration, not a triangle. Thus with this "line" configuration, a maximum of two filters can truely be correct at the same time. Each of these two filters must then have a probability greater than 0.33. The 0.20 is a significant difference from 0.33 as not to to mask "correct" probability values that may be close to 0.33. The Modified MMAC control threshold was change from 0.10 to 0.25. This value ensured that filters with a very low probability of being correct would not apply any control to the bank. As long as the lower bound for preventing "lock-out" (here set at 0.20) is less than this control threshold (now set at 0.25), algorithm performance will not be degraded by the lower bound being artificially large. Thus 0.20 is acceptable in this case, even though 0.05 is a physically more realistic lower bound.

The case with the filter parameter value and the true parameter value set at ω_4 is depicted in Figure 5.67. The parameter estimate is remaining near the correct parameter value. Figures 5.68 and 5.69 illustrate excellent parameter identification and bank movement. The bank movement is nearly instantaneous and the parameter estimate is very good. The reason for the offset in the parameter estimate could be attributed to the ME/I parameter estimate technique being employed. Attempts were made to calculate the proper parameter estimate discussed in Section 2.3, using Equation (1.2) to determine the probability density. Numerical inaccuracies were encountered when calculating the residual covariances, thus the ME/I technique was employed.

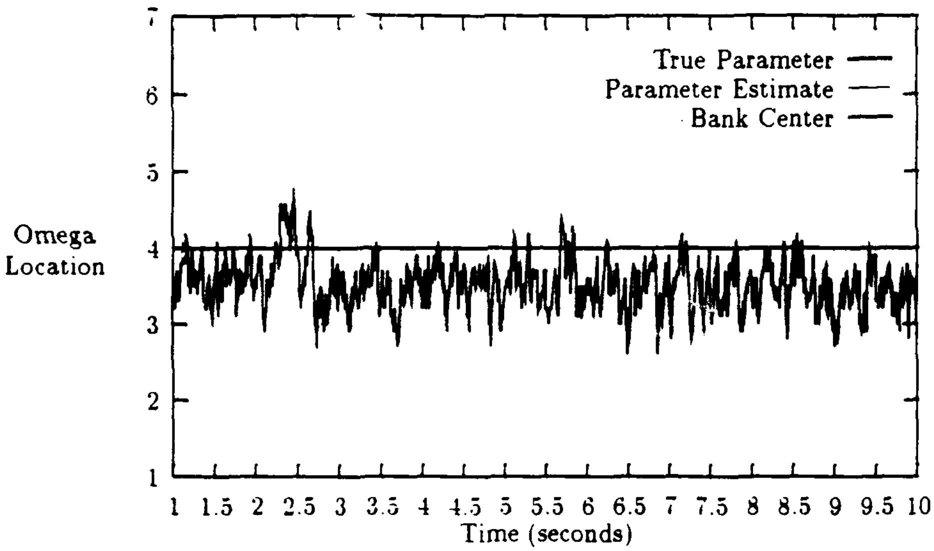

Figure 5.67. 1-by-7 Parameter Space: Initial True Parameter at [4] and Initial Filter Parameter at [4]

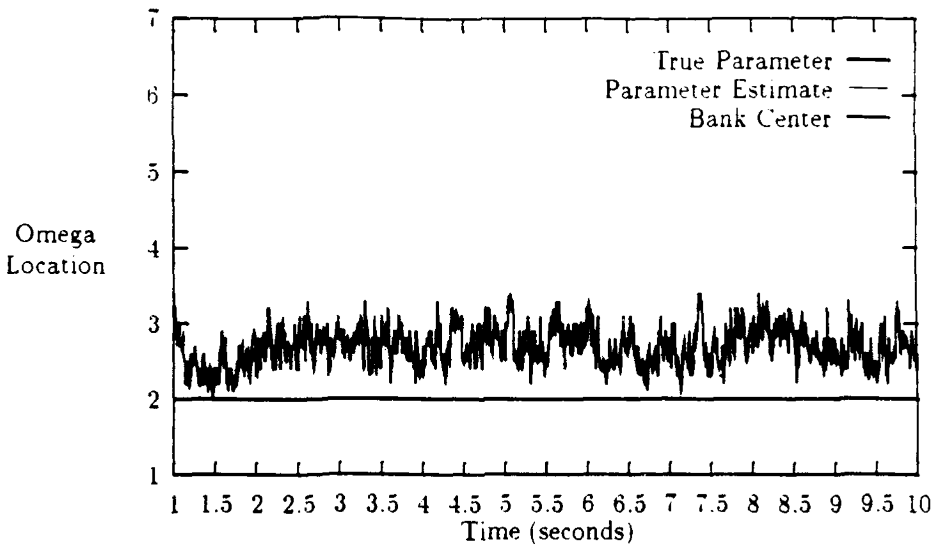

Figure 5.68. 1-by-7 Parameter Space: Initial True Parameter at [2] and Initial Filter Parameter at [4]

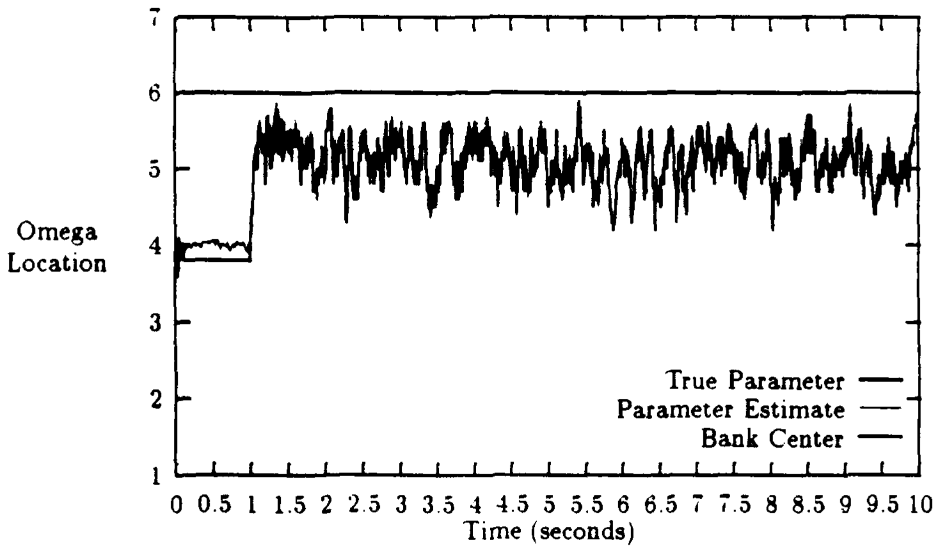

Figure 5.69. 1-by-7 Parameter Space: Initial True Parameter at [6] and Initial Filter Parameter at [4]

Simulations were run allowing the true parameter to jump from an initial value to a second value. The first of the two situations analyzed involves setting the initial true value to ω_4 and letting it instantaneously jump to ω_2 at five seconds into the simulation. The second situation is the same as the first except that the true parameter value jumps to ω_6. Figures 5.70 and 5.71 illustrate a definite proper parameter identification and bank movement. Again the identification and bank movement is nearly instantaneous.

5.5.5 One-by-Seven Discretized Parameter Space with Modified Residual Covariance Matrix. The numerical inaccuracies inhibited the generation of an inverse residual covariance matrix, $\mathbf{A}^{-1}$ for use in Equation(1.2) to compute the p_k probabilities. Thus a method to obtain a modified $\mathbf{A}^{-1}$ was developed [25]. The modified $\mathbf{A}^{-1}$ will account for the relative relationships between the different residual covariances associated with each type of measurement device, rather than weighting position,velocity, and acceleration residuals equally in the decision process. This method examines the diagonal elements of $\mathbf{A}$. This diagonal was partitioned into the appropriate three partitions of residual covariances attributed to the 18 accelerometer measurements, 18 relative velocity measurements and 18 relative position measurements. An average residual variance was calculated for each of the three sets of residual covariances. The average value obtained for the accelerometer residual covariance is 24.46 $(m/sec^2)^2$, the average value obtained for the relative velocity residual covariance is 5.43E-08 $(m)^2$, and the average value obtained for the relative velocity residual covariance is 6.55E-04 $(m/sec)^2$. Each of these values are then inverted and multiplied with an 18-by-18 identity matrix. The resulting three 18-by-18 diagonal matrices are then augmented to form a 54-by-54 diagonal approximated $\mathbf{A}^{-1}$. This matrix is then implemented with Equation (1.1) without the coefficient preceding the exponential. The reason to drop the coefficient is that there is no information gathered from it; the coefficient just scales the result. The results of implementing the modified $\mathbf{A}^{-1}$ are depicted in Figure 5.72. Comparing this result to Figure 5.71 clearly illustrates that using the modified $\mathbf{A}^{-1}$ in determining the parameter estimate provides a poorer parameter estimate.

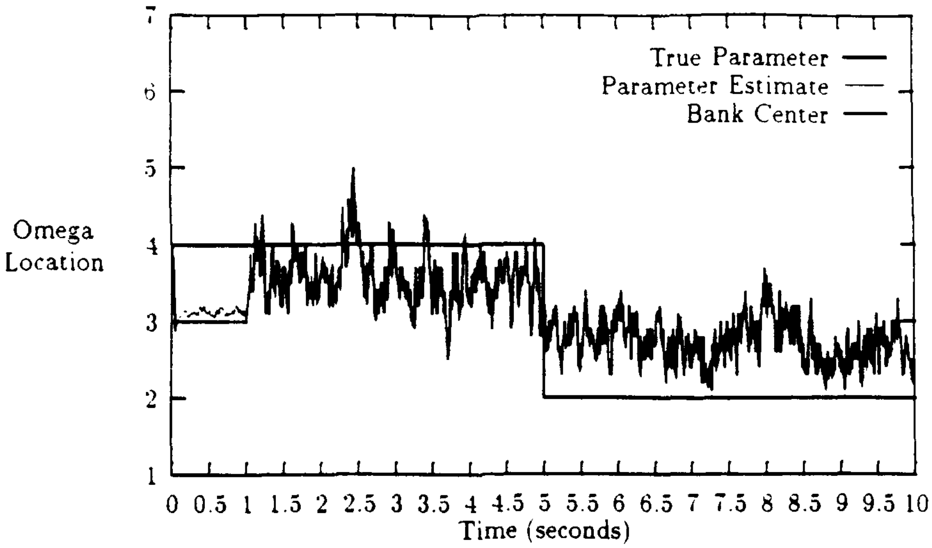

Figure 5.70. 1-by-7 Parameter Space: Initial True Parameter at [4] with Jump to [2] and Initial Filter Parameter at [4]

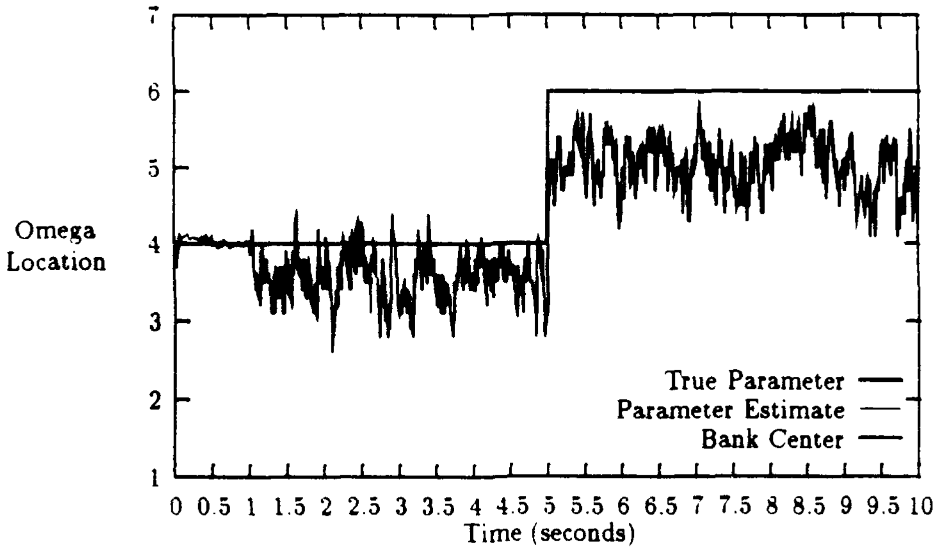

Figure 5.71. 1-by-7 Parameter Space: Initial True Parameter at [4] with Jump to [6] and Initial Filter Parameter at [4]

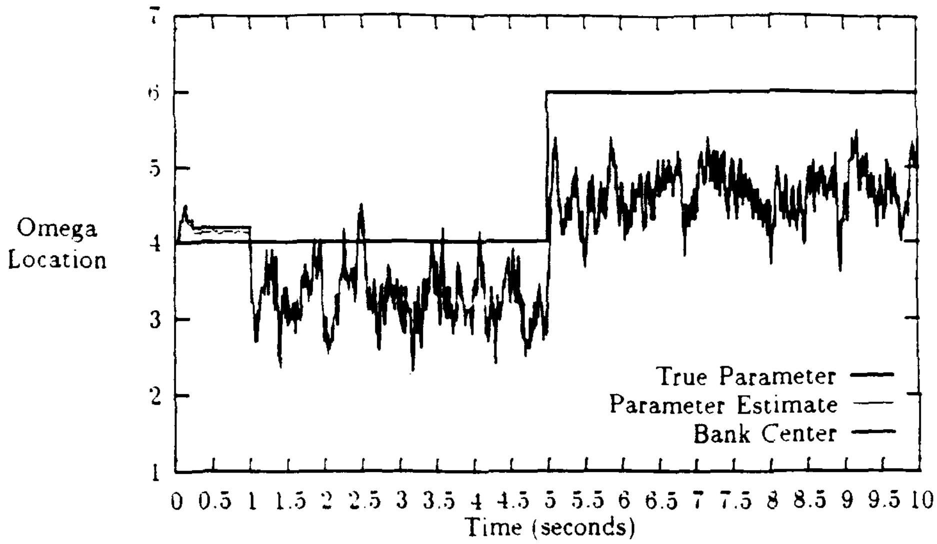

Figure 5.72. 1-by-7 Parameter Space with Modified $\mathbf{A}^{-1}$: Initial True Parameter at [4] with Jump to [6] and Initial Filter Parameter at [4]

5.5.6 Section Review. This section illustrated poor parameter identification by the three-by-seven parameter space with ME/I parameter estimation and parameter position monitoring implemented as the bank move logic. The modified move logic for the three-by-seven parameter space produced a slightly improved parameter estimate but error was still being introduced by treating both ζ and ω as uncertain parameters. The one-by-seven parameter space, using ME/I parameter estimation and parameter position monitoring as the bank move logic, demonstrated very good results, with a small parameter estimation error. The ME/I technique assumes that the residual covariances are equal to the identity matrix. Numerical inaccuracies aborted attempts to calculate the actual residual covariances. Implementing an approximated $\mathbf{A}^{-1}$ resulted in a reduced ability to estimate the proper parameter when compared with the ME/I method

5.6 *Summary*

This chapter presented the tuning procedures and tuning results for the truth model and various filter/controller models. It was demonstrated that none of the filter models developed in this study are capable of meeting the one micro-radian LOS deviation tolerance. The best performance was attained from the full-ordered filter model. The LQG controller designed for the full-ordered filter model displayed immediate "clamping down" of the LOS deviations. Since the dimensions for both types of reduced order filters (modal and internally balanced) were inadequate to model the system, no definite conclusion can be drawn from this study of which reduction technique is best for this application. The discretization of the space indicates an extreme insensitivity to variations of the ζ parameter and high sensitivity to variations of the ω parameter. This sensitivity infers that a one dimensional space for variations in ω may be an adequate representation for the parameter space. The three-by-seven space demonstrated some problems identifying the true parameter. Modifications were made to reduce the choices in the decision logic for moving the bank. This resulted in improved parameter identification trends, but not good enough to be implementable. Parameter identification displayed the best results using a one-by-seven discretized parameter space. The bank movement and parameter identification in the one-by-seven parameter space was nearly instantaneous. The bank was able to estimate the parameter and move appropriately when the true parameter changed by a significant amount (through a jump). There was a small bias error in the parameter estimate which initially seemed due to the ME/I method of parameter estimation. Remember that the ME/I method of parameter estimation assumes a residual covariance equal to the identity matrix. Attempts to calculate the true residual covariances were met with computational numerical inaccuracies. Thus, the calculation and use of an approximated residual covariance inverse was implemented, resulting in poorer performance from the estimator than implementing the ME/I estimation technique. Chapter 6 will make some conclusions about the results displayed in this chapter and make further research recommendations for future work in this area.

VI. Conclusions and Recommendations

6.1 Introduction

The purpose of this research was to design a controller using multiple model adaptive estimation and control (MMAE/MMAC) algorithms to quell vibrations introduced into the SPICE flexible spacecraft structure. Adaptive control is required for this application because previous nonadaptive controller designs exhibit very poor robustness to change in design parameters, especially assumed undamped natural frequencies for bending modes of the structure. The design procedure began with the development of a truth model and several reduced order models. Following the model development, the simulation was coded to test the estimator and controller algorithms with the various filter models. Tuning of the nominal filter and controller was completed. The parameter space was discretized to allow for variations in the undamped natural frequency and the damping ratio parameters. The capability of moving a bank of active filters within the discretized space to identify the true parameter was examined.

The overall conclusion from this study indicates that MMAE/MMAC algorithms will work very nicely in quelling vibrations introduced in the SPICE structure, especially for cases where large parameter variations occur. The remaining sections of this chapter will present conclusions drawn during the study which substantiate this claim.

6.2 Conclusions

The filter and corresponding controller that demonstrated the smallest line-of-sight (LOS) deviation was the one based on the full order structure system model, which is equivalent to the original full order truth model for the structure, but with the noise shaping filters of the truth model removed, so that time-correlated noises are replaced by white noises. The controller for the full-ordered filter demonstrated RMS deviations near the RMS estimator errors and immediate quelling of the oscillation. In order to meet the LOS RMS specification, either additional measurements are needed beyond the original accelerometer outputs and the additional relative position and velocity measurements of the proof mass actuators (PMAs) with respect

to the PMA structural connection points, or more or better actuators (as well as sensors) might be required.

The comparison of the modal reduced order filter models and the internally balanced reduced order filter models resulted in no definite choice of which technique of model reduction is appropriate for this application. This is due to the fact that the dimensions chosen for the reduced order structure models (12 states and 6 states) could not appropriately model the true structure (80 states), and controller performance degraded substantially from the full-ordered controller when either order reduction technique was used.

The parameter space discretization results illustrated the nonlinearity of the optimum parameter space discretization. Also from the discretization, the variation in the ζ axis may be unnecessary due to the insensitivity of the resulting controller to this parameter. The ω parameter space only encompasses a 4.6% variation for this feasibility study; this could easily be expanded into a much larger space at the same fine level of discretization in order to encompass a wider range of parameter variations.

Using the Maximum Entropy with Identity residual covariance assumed (ME/I) estimation technique, the one-by-seven parameter space demonstrated the best true parameter identification. The estimation of the true parameter was nearly instantaneous, even when the true parameter value jumped to a new value. The center of the bank followed the parameter estimate very closely. There was a small bias error in the parameter estimate which at first appeared to be a result of using the ME/I parameter estimation technique. An approximated residual covariance was calculated, which accounted for the relative residual covariance values for each type of measurement device. The parameter identification resulted in poorer performance using the modified residual covariance technique than using the ME/I technique. Thus, the bias was interpreted as not being caused by ME/I assumptions, but rather, a natural consequence of a nonlinear estimation problem.

The identification process implementing the ME/I estimator with the three-by-seven parameter space was very poor. The estimator tried to move the bank in a diagonal direction, which was not possible due to the fact that the bank already encompassed the entire width of the parameter space (i.e., in the damping ratio, or ζ, direction). A modification was made to the bank move logic in which the residuals

of the filters in each column were summed to determine the bank movement direction. This modification limited the bank movement to being along the ω axis. The parameter identification improved with the modification but not to an acceptable level: using the single nominal value of ζ and adapting only to the undamped natural frequency ω, yielded significantly better results.

The results indicate that the MMAE/MMAC algorithms will provide stabilizing control for the SPICE structure even with parameter variations. The following section will discuss several topics that should be explored to enhance performance capabilities.

6.3 *Recommendations*

This research demonstrated that MMAE/MMAC algorithms will perform very nicely for the SPICE 2 structure model. This study implemented ME/I parameter estimation, modified MMAC for the controller, and parameter monitoring for bank movement. Future recommendations are:

1. Implement the newest SPICE structure model (SPICE 3 or 4)
2. Determine the necessary enhancement of measurements needed to meet LOS RMS specifications; additional measurements as well as higher precision measurements should be considered.
3. Ensure actuators can provide the necessary control to meet LOS RMS specifications; consider additional and/or different actuators in order to enhance performance.
4. Increase the ω parameter space axis for the one-dimensional parameter space, in order to be able to implement a controller that is able to handle the entire range of possible parameter values anticipated in the real-world structure.
5. Examine other control logics, such as: MMAC (without the modification explored in Section 5.5.3) and MAP versus Bayesian forms of MMAC algorithms.
6. Explore alternative bank move logics, based on residual monitoring and probability monitoring.

Appendix A. *System Component Matrices*

This appendix lists the various matrices required to describe the state and output equations for the disturbance, PMA and accelerometer models. Also the line of sight transformation matrix used to obtain the "X" and "Y" position errors is presented. The state and output equations for these models were derived in Chapter 3.

Disturbance Matrices

The necessary matrices for Equations (3.1) and (3.2) are:

$\mathbf{F}_n$ =

```
 Columns 1 thru 8
```

-44.4221	0.0000	0.0000	0.0000	0.0000	0.0000	-30.8425	0.0000
0.0000	-44.4221	0.0000	0.0000	0.0000	0.0000	0.0000	-30.8425
0.0000	0.0000	-44.4221	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	-44.4221	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	-44.4221	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	-44.4221	0.0000	0.0000
32.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	32.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	32.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	32.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	32.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	32.0000	0.0000	0.0000
-25.8093	0.0000	0.0000	0.0000	0.0000	0.0000	-17.9195	0.0000
0.0000	-25.8093	0.0000	0.0000	0.0000	0.0000	0.0000	-17.9195
0.0000	0.0000	-25.8093	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	-25.8093	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	-25.8093	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	-25.8093	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

```
 Columns 9 thru 16
```

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
-30.8425	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	-30.8425	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	-30.8425	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	-30.8425	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	-88.8442	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	-88.8442	0.0000	0.0000
-17.9195	0.0000	0.0000	0.0000	0.0000	0.0000	-88.8442	0.0000
0.0000	-17.9195	0.0000	0.0000	0.0000	0.0000	0.0000	-88.8442
0.0000	0.0000	-17.9195	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	-17.9195	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	64.0000	0.0000	0.0000	0.0000

0.0000	0.0000	0.0000	0.0000	0.0000	64.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	64.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	64.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Columns 17 thru 24

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	-61.6850	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	-61.6850	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	-61.6850	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	-61.6850	0.0000	0.0000
-88.8442	0.0000	0.0000	0.0000	0.0000	0.0000	-61.6850	0.0000
0.0000	-88.8442	0.0000	0.0000	0.0000	0.0000	0.0000	-61.6850
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
64.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	64.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

$\mathbf{G}_n =$

4.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	4.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	4.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	4.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	4.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.3240	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	2.3240	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.3240	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2.3240	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.3240	0.0000

0.0000	0.0000	0.0000	0.0000	0.0000	2.3240
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

C_n =

Columns 1 thru 8

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Columns 9 thru 16

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Columns 17 thru 24

0.0000	0.0000	315.5189	0.0000	0.0000	0.0000	0.0000	0.0000
0.0C00	0.0000	0.0000	315.5189	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	315.5189	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	443.8238	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	443.8238	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	443.8238

PMA Matrices

The matrices required for Equations (3.4) and (3.5) in defining the PMA model are:

$\mathbf{F}_{pm}$ =

Columns 1 thru 6

-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 19 thru 24

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 25 thru 30

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 31 thru

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.2026D-01	0.0000D+00

$\mathbf{B}_{pm}$ =

Columns 1 thru 6

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.0168D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 19 thru 24

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 25 thru 30

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 31 thru 36

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 37 thru 42

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 43 thru 48

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 49 thru 54

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

G_{pm} =

Columns 1 thru 6

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5600D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

C_{pm} =

Columns 1 thru 6

0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 19 thru 24

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 25 thru 30

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 31 thru 36

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4422D+01	4.4808D+03

$\mathbf{D}_{up} =$

Columns 1 thru 6

-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.0168D+02

Columns 19 thru 24

-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 25 thru 30

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 31 thru 36

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4808D+03

Columns 37 thru 42

1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 43 thru 48

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 49 thru 54

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00

$\mathbf{D}_{up}$ =

Columns 1 thru 6

1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.5600D-02

Accelerometer Matrices

The state equation, Equation (3.18), and the measurement equation, Equation (3.19) for modelling the accelerometers are composed of the following matrices, where $\mathbf{F}_{acc}$ and $\mathbf{H}_{acc}$ are the corresponding augmented matrices of Equations (3.18) and (3.19):

$\mathbf{F}_{acc}$ =

Columns 1 thru 6

-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.1416D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 19 thru 24

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 25 thru 30

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 31 thru 36

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4422D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.2000D+01

Columns 37 thru 42

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 43 thru 48

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 49 thru 54

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.0843D+01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0 0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

$\mathbf{B}_2 =$

Columns 1 thru 12

2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

```
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.

Columns   13 thru   18
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.
2.   0.   0.   0.   0.   0.
0.   2.   0.   0.   0.   0.
0.   0.   2.   0.   0.   0.
0.   0.   0.   2.   0.   0.
0.   0.   0.   0.   2.   0.
0.   0.   0.   0.   0.   2.
```

$C_1 =$

```
Columns   1 thru   12
1.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   1.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   1.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   1.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   1.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   1.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   1.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   1.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   1.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   1.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   1.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   1.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
```

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0	0.	0.	0.	0.	0.	0.	0.	0.
0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

Columns 13 thru 18

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
1.	0.	0.	0.	0.	0.
0.	1.	0.	0.	0.	0.
0.	0.	1.	0.	0.	0.
0.	0.	0.	1.	0.	0.
0.	0.	0.	0.	1.	0.
0.	0.	0.	0.	0.	1.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

$\mathbf{H}$[illegible] =

Columns 1 thru 6

-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5708D+00

Columns 19 thru 24

-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 25 thru 30

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 31 thru 36

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.9711D-04

Columns 37 thru 42

-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 43 thru 48

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 49 thru 54

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3685D-04

$\mathbf{D}_{ua}$ =

Columns 1 thru 12

1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

Columns 13 thru 18

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
1.	0.	0.	0.	0.	0.
0.	1.	0.	0.	0.	0.
0.	0.	1.	0.	0.	0.
0.	0.	0.	1.	0.	0.
0.	0.	0.	0.	1.	0.
0.	0.	0.	0.	0.	1.

$\mathbf{D}_{ua} =$

Columns 1 thru 6

4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.4372D-06

Line of Sight Transformation Matrix

The transformation matrix to convert the y_{los} outputs of Equation (3.15) is as follows:

LOS Transformation Matrix =

Columns 1 thru 6

0.0000D+00	-1.8896D-02	2.8571D-01	0.0000D+00	0.0000D+00	-1.8896D-02
1.8896D-02	0.0000D+00	0.0000D+00	2.8571D-01	1.8896D-02	0.0000D+00

Columns 7 thru 12

2.8571D-01	0.0000D+00	0.0000D+00	-1.8896D-02	2.8571D-01	0.0000D+00
0.0000D+00	2.8571D-01	1.8896D-02	0.0000D+00	0.0000D+00	2.8571D-01

Columns 13 thru 18

0.0000D+00	-1.8896D-02	2.8571D-01	0.0000D+00	0.0000D+00	-1.8896D-02
1.8896D-02	0.0000D+00	0.0000D+00	2.8571D-01	1.8896D-02	0.0000D+00

Columns 19 thru 24

2.8571D-01	0.0000D+00	0.0000D+00	-1.8896D-02	2.8571D-01	0.0000D+00
0.0000D+00	2.8571D-01	1.8896D-02	0.0000D+00	0.0000D+00	2.8571D-01

Columns 25 thru 30

0.0000D+00	-1.8896D-02	-6.1548D-01	0.0000D+00	7.7275D-02	0.0000D+00
1.8896D-02	0.0000D+00	0.0000D+00	-6.1548D-01	0.0000D+00	0.0000D+00

Columns 31 thru 36

0.0000D+00	-2.0000D-01	0.0000D+00	0.0000D+00	4.4092D-02	0.0000D+00
0.0000D+00	0.0000D+00	-2.0000D-01	-4.4092D-02	0.0000D+00	-4.4092D-02

Columns 37 thru 39

4.4092D-02	0.0000D+00	4.4092D-02
0.0000D+00	-4.4092D-02	0.0000D+00

Appendix B. *Truth Model Filter Model Matrices*

This appendix contains the matrices used in the Truth Model representation of the SPICE structure and the matrices for the five reduced order models. The three internally balanced models are displayed in block diagonal form. This allows for simple determination of ω.

Truth Model

The matrices for the 40-mode truth model are in modal coordinate form, corresponding to Equations (3.9) and Equation (3.14). The $\mathbf{F}_s$ matrix resembles the form of Equation (3.37) and thus only the $-2\zeta_i\omega_i$ and $-\omega_i^2$ diagonal terms are given.

$-2\zeta_i\omega_i =$

```
  Columns     1 thru     6
-1.9457D-01  -2.2308D-01  -2.2309D-01  -4.6360D-01  -4.6368D-01  -4.7002D-01

  Columns     7 thru    12
-6.7135D-01  -7.2082D-01  -7.2091D-01  -7.5850D-01  -8.2069D-01  -8.2116D-01

  Columns    13 thru    18
-8.3278D-01  -8.3315D-01  -8.3362D-01  -9.2483D-01  -9.2529D-01  -9.3776D-01

  Columns    19 thru    24
-1.0813D+00  -1.0817D+00  -1.1255D+00  -1.1394D+00  -1.1396D+00  -1.2232D+00

  Columns    25 thru    30
-1.2429D+00  -1.2432D+00  -1.3447D+00  -1.3789D+00  -1.4007D+00  -1.4017D+00

  Columns    31 thru    36
-1.4622D+00  -1.4623D+00  -1.5002D+00  -1.5921D+00  -1.6422D+00  -1.6615D+00

  Columns    37 thru    40
 -1.6619D+00  -1.7308D+00  -1.7333D+00  -1.8125D+00
```

$-\omega_i^2 =$

```
  Columns    41 thru    46
-2.3661D+03  -3.1104D+03   -3.1105D+03  -1.3433D+04  -1.3437D+04  -1.3808D+04

  Columns    47 thru    52
-2.8169D+04  -3.2474D+04   -3.2482D+04  -3.5958D+04  -4.2096D+04  -4.2144D+04
```

```
  Columns     53 thru     58
-4.3346D+04  -4.3383D+04   -4.3432D+04  -5.3457D+04  -5.3510D+04  -5.4962D+04

  Columns     59 thru     64
-7.3080D+04  -7.3132D+04   -7.9177D+04  -8.1133D+04  -8.1169D+04  -9.3510D+04

  Columns     65 thru     70
-9.6555D+04  -9.6603D+04   -1.1302D+05  -1.1883D+05  -1.2262D+05  -1.2279D+05

  Columns     71 thru     76
-1.3364D+05  -1.3364D+05   -1.4067D+05  -1.5843D+05  -1.6856D+05  -1.7254D+05

  Columns     77 thru     80
-1.7262D+05  -1.8724D+05   -1.8778D+05  -2.0533D+05
```

The same method used for displaying the $\mathbf{F}_s$ matrix will be used for the $\mathbf{B}_s$ matrix. Equation (3.35) illustrates that the top portion of the matrix is full of non-zero entries while the bottom portion is full of zeros.

```
  Columns      1 thru      6
-1.3623D-02  -2.4230D-02  -4.3212D-02  -7.6436D-02   2.7714D-02   4.3360D-04
-2.5727D-02   4.2685D-03  -6.6964D-02  -2.5473D-03  -1.6914D-02  -3.3997D-03
-8.6415D-03   2.1044D-02  -9.9608D-03   6.6314D-02  -1.2267D-03   3.0144D-02
-4.0065D-02  -6.6139D-02  -3.9946D-02  -6.4497D-02  -4.0773D-02   3.7497D-03
-6.2510D-03   8.3870D-04   3.1594D-02  -2.1174D-02   6.5786D-02   2.1193D-03
 3.7824D-02  -2.4105D-02   1.5467D-02  -1.0974D-02  -1.0776D-03   4.4859D-02
 6.4353D-02   9.7359D-02   4.6000D-02   6.2429D-02  -1.1639D-01   6.9464D-03
 2.0360D-03  -9.2736D-02   9.1386D-03  -7.1341D-02  -1.5320D-01   1.3105D-02
 1.0283D-01   9.1908D-02   8.1297D-02   6.1744D-02  -3.0946D-03  -6.3287D-02
-8.7571D-02   5.9801D-02  -6.8419D-02   4.2042D-02  -7.7045D-03  -1.0556D-01
-8.3280D-02   7.2406D-02  -3.5751D-02   1.6382D-02  -2.1820D-02   8.3841D-02
-4.7006D-02  -1.7770D-02  -1.2890D-03   1.9502D-02  -3.7856D-02  -7.9850D-02
-5.6175D-02   6.3890D-02  -4.9595D-02   5.3496D-02  -3.2797D-03   1.1301D-01
-8.8000D-02   3.7311D-02  -8.6935D-02   2.9918D-02  -3.2231D-02  -5.0458D-02
 8.9654D-03  -2.6222D-02   8.5272D-03  -2.4490D-02  -1.5281D-02  -5.9866D-03
-1.8430D-02   9.3927D-03   5.1297D-02  -3.0385D-02  -2.7650D-02   1.0160D-02
-1.5344D-02  -2.7173D-02   1.8453D-02   2.7215D-02  -1.4783D-02  -1.8219D-02
-6.5441D-03  -1.9378D-02  -3.1068D-02  -5.4152D-02   2.0039D-02   3.6875D-03
 7.6758D-03   3.2433D-03   9.6395D-03   3.4720D-02   1.2563D-02   4.5924D-03
 1.6761D-03  -1.2958D-02  -3.5242D-02  -4.9711D-02   3.7002D-04  -8.3902D-03
-9.6199D-04  -5.1312D-03   4.9587D-02  -2.8331D-02   4.1058D-03   8.4838D-04
 2.7496D-02   8.7557D-03  -2.4680D-02   2.1432D-02   2.7535D-02   8.4498D-03
 8.6611D-03  -2.7255D-02  -3.1170D-02   1.1137D-02   8.8520D-03  -2.7381D-02
-6.0322D-04  -1.5262D-03  -2.6984D-03  -4.5889D-03   1.8786D-03   4.5151D-04
 2.9274D-02  -1.2105D-02  -3.4815D-02   2.8004D-02   4.8999D-03  -1.9633D-03
```

1.1746D-02	-1.0929D-02	-2.5830D-02	-5.2141D-03	1.6933D-03	-3.4982D-02
8.4941D-03	1.3198D-02	-1.0976D-02	-1.8584D-02	-1.5396D-02	9.0408D-04
3.4102D-02	5.3551D-02	-3.9316D-02	-6.5875D-02	-6.3491D-02	3.0309D-03
-2.9718D-03	2.0953D-02	7.0951D-03	-1.6889D-02	-7.5158D-04	3.4050D-02
3.3154D-02	-6.2157D-03	-3.5047D-02	9.6154D-03	2.0500D-02	-4.7917D-03
-2.5177D-03	9.0276D-03	1.7032D-03	-1.1815D-02	5.7940D-02	5.8958D-04
3.4265D-02	5.3087D-02	-4.7950D-02	-8.0232D-02	2.5820D-02	-5.9961D-03
-2.3487D-02	1.3816D-02	2.8539D-02	-1.8983D-02	8.1461D-04	-2.7775D-02
-1.1315D-02	-1.8539D-02	1.1054D-02	1.8439D-02	2.1732D-02	-8.6847D-04
-1.6746D-02	8.5462D-03	1.7705D-02	-9.8281D-03	1.8978D-03	-1.8273D-02
-1.5436D-02	9.0678D-03	1.2153D-02	-7.3592D-03	-2.1050D-02	1.0609D-02
1.3631D-02	1.9373D-02	-1.3194D-02	-1.8974D-02	1.2457D-02	1.5241D-02
-5.4971D-03	-4.3360D-03	3.3963D-03	7.1612D-03	1.8874D-03	3.1458D-03
2.3332D-04	-4.9305D-03	3.4741D-03	4.2969D-03	-7.0954D-03	1.2215D-03
4.9903D-02	7.8937D-02	-4.7245D-02	-7.4093D-02	-9.1078D-02	3.9395D-03

Columns 7 thru 12

8.7506D-02	1.0181D-03	-1.4352D-02	2.3807D-02	-4.4968D-02	7.5453D-02
-6.4048D-02	-7.8443D-03	-2.7650D-02	-7.7215D-03	-6.9215D-02	-9.2044D-03
-5.3425D-03	7.0000D-02	2.9968D-03	1.9056D-02	-4.3029D-03	6.3874D-02
-4.0132D-02	-3.2565D-02	2.3297D-02	-2.8706D-02	-1.1138D-02	-4.7477D-02
6.4279D-02	-2.0751D-02	3.1660D-02	-6.0530D-02	4.8732D-02	-4.9295D-02
-1.1884D-03	1.7521D-02	-3.7831D-02	-2.3994D-02	-1.5920D-02	-1.1477D-02
-7.6765D-02	8.3985D-03	5.2269D-02	-1.0419D-01	3.1363D-02	-7.0781D-02
-1.1006D-01	1.2369D-02	1.6474D-02	9.4682D-02	2.2221D-02	7.3924D-02
-2.4240D-03	-5.7529D-02	-8.4608D-02	1.0623D-01	-6.3859D-02	7.4741D-02
-1.7333D-03	-8.0189D-02	9.5297D-02	4.5739D-02	7.0528D-02	3.8237D-02
1.3214D-02	3.0962D-02	-4.3695D-02	2.4509D-02	4.0754D-04	-1.9066D-02
1.1452D-02	-2.9919D-02	-9.9092D-02	-5.8226D-02	-4.0442D-02	-1.7737D-02
-9.2578D-03	1.0559D-01	-1.7410D-02	2.7501D-02	-1.3031D-02	2.7342D-02
-2.6410D-02	-4.5550D-02	-6.7609D-02	-2.1161D-02	-5.7104D-02	-2.1109D-02
-1.5782D-02	-1.7980D-03	-8.9000D-02	-4.6695D-02	-8.2540D-02	-5.1300D-02
2.7771D-02	-3.2060D-02	-2.2593D-02	1.7966D-02	3.7932D-02	-1.0712D-02
1.6103D-02	5.0128D-02	-6.8360D-03	-2.3368D-02	3.8062D-02	3.9612D-02
6.2960D-02	6.6049D-04	-1.3038D-02	1.5060D-02	-3.1145D-02	5.4459D-02
6.9512D-02	-1.0303D-04	1.1157D-02	-1.0809D-04	9.5513D-03	-3.5370D-02
-3.3579D-04	1.0149D-02	5.2309D-03	-9.5206D-03	3.5138D-02	-4.9428D-02
-1.0031D-03	5.7772D-02	-3.6960D-03	2.3508D-03	-4.8370D-02	-2.9355D-02
7.8973D-03	-1.0626D-02	2.7179D-02	8.7358D-03	-3.7418D-02	-2.3825D-02
2.6342D-03	4.3388D-02	8.7263D-03	-2.7555D-02	1.5593D-02	-1.1034D-03
5.0285D-03	-3.3293D-04	-7.2623D-04	1.5048D-03	-3.3662D-03	4.7566D-03
1.9001D-02	4.5774D-03	2.6120D-02	1.3612D-02	-2.8565D-02	-2.9688D-02
-2.7457D-03	4.8127D-02	-1.4075D-02	-1.3990D-02	3.1560D-02	1.1872D-03
2.1175D-02	-3.9108D-04	7.2086D-03	-1.3896D-02	-1.0730D-02	1.8866D-02
7.6776D-02	-1.4061D-03	2.8908D-02	-5.6328D-02	-3.6897D-02	6.6979D-02
1.6187D-03	-3.7688D-02	9.4775D-03	2.6202D-02	-1.3779D-02	-2.3338D-02
-1.5274D-02	5.1902D-03	2.8453D-02	4.6401D-03	-2.9397D-02	-8.8461D-03
-8.5843D-02	-2.4997D-03	2.0757D-02	-4.6959D-02	-3.4537D-02	6.7896D-02
-3.8693D-02	5.3977D-03	-2.2458D-02	3.0419D-02	3.2748D-02	-4.4878D-02
5.7219D-04	3.4658D-02	2.2615D-02	1.5221D-02	-2.9067D-02	-1.7861D-02
-2.1639D-02	5.6414D-04	-1.0554D-02	1.8763D-02	1.0741D-02	-1.8543D-02

-1.2104D-03	1.9822D-02	1.5546D-02	1.1468D-02	-1.7026D-02	-1.1544D-02
2.0579D-02	-8.4401D-03	-1.7363D-02	1.4817D-02	1.5902D-02	-1.5294D-02
-1.2364D-02	-1.2177D-02	7.6521D-03	1.8631D-02	-4.9225D-03	-1.6541D-02
-2.2367D-03	1.4828D-03	3.4619D-03	-5.1808D-03	-3.1881D-03	7.4997D-03
8.9261D-03	-2.1460D-04	2.2014D-03	2.9644D-03	2.0463D-03	-1.2348D-03
8.5515D-02	-3.9921D-03	4.2958D-02	-8.1565D-02	-4.0028D-02	7.6883D-02

Columns 13 thru 18

9.6138D-04	-1.0056D-03	6.3586D-04	-1.0012D-03	1.0268D-03	-6.4678D-04
1.7286D-02	-1.1263D-02	-3.3267D-02	-2.1416D-02	1.5946D-02	3.2676D-02
-2.8400D-02	-3.1218D-02	-7.6050D-04	2.5389D-02	2.9199D-02	5.8752D-03
-2.4920D-02	-3.6410D-02	3.6311D-02	2.5905D-02	-1.2056D-02	9.8429D-03
-2.8017D-02	-9.3400D-03	-7.4827D-03	-2.6759D-02	3.5323D-02	3.5925D-02
7.0300D-03	6.8509D-03	8.8863D-03	8.4678D-03	7.7459D-03	8.4289D-03
-9.4167D-03	9.4943D-03	-9.4378D-03	9.5534D-03	-9.4431D-03	9.5425D-03
-6.8247D-03	7.4866D-03	-8.4179D-03	-1.5589D-02	1.5107D-02	8.0023D-03
-1.3572D-02	-1.3612D-02	1.2655D-02	2.9440D-04	9.2915D-04	1.3310D-02
-1.1034D-02	-9.1059D-03	-1.0961D-02	-8.8666D-03	-1.1136D-02	-9.0607D-03
1.4139D-02	-1.5878D-03	-9.1393D-03	1.3200D-02	-5.3307D-03	-1.1872D-02
2.0147D-03	-1.4467D-02	1.0290D-02	5.4794D-03	-1.3471D-02	7.7907D-03
-1.9101D-02	-1.0746D-02	9.9964D-03	-1.7899D-02	-8.4190D-03	1.0098D-02
2.4630D-03	2.7450D-02	9.6358D-03	2.2844D-03	2.7395D-02	1.2260D-02
-2.3684D-02	-1.1060D-02	-2.7298D-02	-2.5797D-02	-9.9770D-03	-2.7576D-02
1.9162D-02	-2.8685D-02	-2.9452D-02	2.0354D-02	1.0239D-02	8.2791D-03
2.2892D-02	-7.1388D-03	5.1952D-03	-2.1741D-02	-2.7789D-02	2.8028D-02
-2.4593D-02	2.3862D-02	-2.4647D-02	2.3648D-02	-2.4880D-02	2.4142D-02
-4.0298D-03	4.3091D-03	2.7086D-03	-2.7431D-03	1.8103D-03	-1.8715D-03
6.6309D-04	-4.5746D-04	3.3504D-03	-3.7020D-03	-3.8348D-03	4.0612D-03
-8.2823D-04	2.2356D-04	-7.5342D-04	2.8244D-04	-7.0485D-04	2.8185D-04
7.0358D-03	-5.2314D-03	-5.0689D-03	-1.8897D-03	-1.8705D-03	7.0352D-03
-1.6632D-03	-5.0290D-03	-5.2619D-03	7.0982D-03	7.0608D-03	-2.0906D-03
1.4028D-02	-1.4244D-02	1.4321D-02	-1.4253D-02	1.4283D-02	-1.4160D-02
6.9050D-03	-5.4654D-03	1.8874D-03	9.2623D-03	-9.1619D-03	-3.4041D-03
6.4346D-03	7.2429D-03	-9.1738D-03	1.0590D-03	3.0747D-03	-8.7808D-03
5.5275D-03	-5.5260D-03	5.4142D-03	-5.7107D-03	5.6427D-03	-5.6897D-03
-1.5385D-03	1.3737D-03	-1.5840D-03	1.4370D-03	-1.7158D-03	1.2060D-03
1.9879D-02	2.2537D-02	-1.9421D-02	-7.0463D-03	-6.3558D-04	-1.5431D-02
-1.0963D-02	4.9255D-03	-1.1967D-02	-2.1913D-02	2.2776D-02	1.6986D-02
3.9415D-03	-9.7805D-04	-1.6643D-03	3.8140D-03	-2.4735D-03	-2.6548D-03
-6.2438D-05	-3.3403D-03	3.4775D-03	8.6997D-04	-3.2861D-03	2.5795D-03
-2.4710D-03	-1.9024D-03	-2.0978D-03	-1.5357D-03	-2.3038D-03	-1.5260D-03
-9.2062D-03	9.4071D-03	-8.7612D-03	9.4670D-03	-8.7047D-03	9.4242D-03
1.7091D-02	1.7558D-02	1.6980D-02	1.6968D-02	1.6972D-02	1.7211D-02
-2.8099D-03	7.6515D-03	7.2213D-03	-3.1791D-03	-5.0944D-03	-4.5770D-03
6.6018D-03	1.8228D-04	-2.5789D-03	-7.1730D-03	-6.1840D-03	5.4845D-03
1.2775D-03	-6.5650D-03	-1.8686D-02	2.0174D-02	1.6924D-02	-1.3313D-02
-2.0532D-02	1.9006D-02	8.8463D-03	-4.0562D-03	1.1496D-02	-1.5728D-02
1.5681D-02	-1.5350D-02	1.5441D-02	-1.4473D-02	1.5449D-02	-1.4937D-02

As with the $\mathbf{B}_3$ matrix, the $\mathbf{G}_3$ matrix is fully populated at the top half and all the lower half entries are zero.

6.7050D-02	5.7904D-02	-6.9768D-05	7.4297D-05	-5.3197D-05	-2.3962D-04
-2.4962D-02	-2.4385D-03	-2.2213D-02	1.9416D-02	-2.0504D-03	-1.7381D-02
-2.1980D-03	2.4142D-02	-1.5986D-02	-8.8429D-03	2.1255D-02	-1.2394D-02
6.3352D-03	9.9012D-03	3.3262D-04	2.5487D-02	-2.2981D-02	2.5208D-04
-1.0152D-02	6.3762D-03	2.5273D-02	-1.3223D-02	-1.4356D-02	2.8199D-02
2.0730D-04	4.9984D-04	-3.2851D-02	-3.2895D-02	-3.4255D-02	-3.3326D-02
3.6551D-02	3.1170D-02	4.0935D-04	-4.7897D-05	-9.2141D-05	-1.0700D-04
7.5760D-03	-2.2244D-03	6.7454D-03	-5.5183D-03	-1.7243D-03	7.2801D-03
-1.4544D-03	-6.7314D-03	1.8815D-03	5.1857D-03	-7.4122D-03	2.1800D-03
1.6771D-03	1.1492D-03	5.2734D-03	3.3336D-03	3.3924D-03	3.3887D-03
1.5654D-03	-3.1126D-03	2.8055D-02	-5.7582D-03	-2.2648D-02	2.8369D-02
4.2020D-03	1.8971D-03	9.3011D-03	-2.9729D-02	2.0297D-02	9.8505D-03
3.8989D-03	-1.3822D-02	1.1177D-02	2.3964D-03	-1.0266D-02	1.1446D-02
1.3684D-02	1.6907D-03	4.2836D-03	-1.3227D-02	-4.0626D-04	5.3781D-03
7.4831D-03	5.0712D-03	6.0223D-03	-2.2123D-03	8.7298D-03	6.1760D-03
-7.9912D-03	5.1006D-03	2.1451D-02	-1.0375D-02	-1.1181D-02	2.1521D-02
-5.2547D-03	-7.7992D-03	5.6332D-04	-1.8742D-02	1.8398D-02	4.2658D-04
-1.8194D-02	-1.5388D-02	-6.6476D-04	-1.1695D-04	1.5151D-04	-7.3399D-05
-4.6877D-03	1.1274D-03	-7.6046D-03	8.3024D-03	-3.2399D-04	-7.9358D-03
6.8085D-04	3.8854D-03	-4.9827D-03	-4.5176D-03	9.2552D-03	-4.9592D-03
7.9367D-06	5.1336D-05	1.8010D-02	1.1964D-02	1.2626D-02	1.2186D-02
4.2808D-03	1.2454D-03	-1.0177D-02	1.4219D-02	-3.7175D-03	-1.0223D-02
8.7503D-04	-4.1772D-03	-1.0474D-02	-3.8374D-03	1.4026D-02	-1.0521D-02
-1.1683D-03	-1.0154D-03	3.8624D-05	6.3738D-05	5.7245D-06	1.1056D-04
3.3561D-03	-9.8940D-05	-1.0708D-02	3.2566D-03	3.6099D-04	-3.6072D-03
-4.9498D-04	-3.5154D-03	-4.6218D-03	-2.2372D-03	3.9055D-03	-1.5485D-03
-4.9383D-03	-4.1457D-03	6.2790D-06	1.5110D-04	2.0643D-04	2.2714D-04
-1.7707D-02	-1.4747D-02	-1.3893D-04	7.6302D-04	7.5656D-04	6.7700D-04
1.0264D-03	4.0453D-03	1.4688D-03	-4.0171D-03	6.6933D-03	-2.7315D-03
4.3603D-03	-8.0218D-04	-4.2470D-03	-5.5763D-03	-7.8593D-04	6.3588D-03
4.7396D-03	-3.1869D-03	8.0906D-03	-4.6339D-03	-3.5968D-03	8.0859D-03
3.4094D-03	3.3852D-03	-4.5294D-04	-6.6937D-03	7.6053D-03	-5.2600D-04
1.8536D-05	8.6467D-05	7.0952D-03	-6.7625D-03	-6.4913D-03	-6.7469D-03
5.1547D-03	4.2604D-03	-3.8038D-05	-5.6347D-05	-1.6556D-04	-1.4791D-05
4.3785D-04	3.8369D-04	4.0370D-03	-3.0869D-03	-2.6823D-03	-2.9223D-03
-2.2873D-03	1.9217D-03	1.4929D-03	3.0355D-03	3.8598D-03	-6.8603D-03
2.2701D-03	1.9510D-03	-1.0929D-04	-6.0687D-03	5.7585D-03	3.8988D-04
-9.6819D-05	3.2577D-04	2.7363D-03	-4.7267D-04	1.8593D-03	-1.4287D-03
-1.4114D-05	1.3601D-04	-3.1939D-03	-1.9592D-03	4.7156D-04	1.5324D-03
-2.2317D-02	-1.8485D-02	-4.6651D-05	3.6711D-04	7.7235D-04	7.0192D-04

$\mathbf{C}_3 =$

Columns 1 thru 6

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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2.6506D-03	5.7393D-03	1.9278D-03	1.8574D-02	2.8984D-03	-1.7778D-02
4.7144D-03	-9.5223D-04	-4.6947D-03	3.0662D-02	-3.8888D-04	1.1330D-02
8.4079D-03	1.4938D-02	2.2221D-03	1.8519D-02	-1.4649D-02	-7.2701D-03
1.4872D-02	5.6825D-04	-1.4794D-02	2.9901D-02	9.8181D-03	5.1581D-03
-5.3923D-03	3.7732D-03	2.7365D-04	1.8903D-02	-3.0503D-02	5.0648D-04
-8.4367D-05	7.5842D-04	-3.7248D-03	-1.7384D-03	-9.8266D-04	-2.1085D-02
-1.7026D-02	1.4288D-02	1.1918D-03	1.8605D-02	-2.9805D-02	5.5860D-04
-1.9809D-04	1.7499D-03	-1.5616D-02	1.5097D-02	9.6218D-03	-8.2351D-03
2.7924D-03	6.1682D-03	-6.6855D-04	-1.0801D-02	-1.4680D-02	1.7787D-02
-4.6322D-03	1.7225D-03	-4.2511D-03	1.3308D-02	2.8066D-02	1.1278D-02
8.7495D-03	1.5441D-02	9.5991D-04	5.1634D-03	-2.2596D-02	7.4829D-03
-1.4681D-02	2.0533D-03	-1.4249D-02	2.2010D-02	2.2857D-02	5.3943D-03
-1.8706D-04	-3.8561D-03	6.3356D-03	1.1553D-02	1.2991D-02	-3.3043D-03
1.9567D-04	2.5126D-03	6.9643D-03	1.6880D-02	4.3308D-03	-3.2201D-03
-1.2372D-04	7.4213D-03	1.6966D-04	-1.6834D-02	3.4696D-03	-4.1768D-03

1.9481D-04	4.7775D-03	-5.6640D-03	-1.2010D-02	1.2408D-02	-3.9801D-03
-1.9973D-04	-3.5574D-03	-6.5138D-03	5.5890D-03	-1.6378D-02	-3.6408D-03
1.2584D-04	-7.2895D-03	-1.3107D-03	-4.5632D-03	-1.6657D-02	-3.9618D-03
-1.3623D-02	-2.5727D-02	-8.6415D-03	-4.0065D-02	-6.2510D-03	3.7824D-02
-2.4230D-02	4.2685D-03	2.1044D-02	-6.6139D-02	8.3870D-04	-2.4105D-02
-4.3212D-02	-6.6964D-02	-9.9608D-03	-3.9946D-02	3.1594D-02	1.5467D-02
-7.6436D-02	-2.5173D-03	6.6314D-02	-6.4497D-02	-2.1174D-02	-1.0974D-02
2.7714D-02	-1.6914D-02	-1.2267D-03	-4.0773D-02	6.5786D-02	-1.0776D-03
4.3360D-04	-3.3997D-03	3.0144D-02	3.7497D-03	2.1193D-03	4.4859D-02
8.7506D-02	-6.4048D-02	-5.3425D-03	-4.0132D-02	6.4279D-02	-1.1884D-03
1.0181D-03	-7.8443D-03	7.0000D-02	-3.2565D-02	-2.0751D-02	1.7521D-02
-1.4352D-02	-2.7650D-02	2.9968D-03	2.3297D-02	3.1660D-02	-3.7831D-02
2.3807D-02	-7.7215D-03	1.9056D-02	-2.8706D-02	-6.0530D-02	-2.3994D-02
-4.4968D-02	-6.9215D-02	-4.3029D-03	-1.1138D-02	4.8732D-02	-1.5920D-02
7.5453D-02	-9.2044D-03	6.3874D-02	-4.7477D-02	-4.9295D-02	-1.1477D-02
9.6138D-04	1.7286D-02	-2.8400D-02	-2.4920D-02	-2.8017D-02	7.0300D-03
-1.0056D-03	-1.1263D-02	-3.1218D-02	-3.6410D-02	-9.3400D-03	6.8509D-03
6.3586D-04	-3.3267D-02	-7.6050D-04	3.6311D-02	-7.4827D-03	8.8863D-03
-1.0012D-03	-2.1416D-02	2.5389D-02	2.5905D-02	-2.6759D-02	8.4678D-03
1.0268D-03	1.5946D-02	2.9199D-02	-1.2056D-02	3.5323D-02	7.7459D-03
-6.4678D-04	3.2676D-02	5.8752D-03	9.8429D-03	3.5925D-02	8.4289D-03
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Columns 7 thru 12

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-4.3203D-02	-1.4676D-03	-7.4127D-02	6.6423D-02	6.8347D-02	3.8600D-02
-6.5362D-02	6.6847D-02	-6.6257D-02	-4.5359D-02	-5.9423D-02	1.4592D-02
-3.0882D-02	-6.5873D-03	-5.8608D-02	5.1896D-02	2.9341D-02	1.0584D-03
-4.1911D-02	5.1424D-02	-4.4512D-02	-3.1889D-02	-1.3444D-02	-1.6014D-02
7.8136D-02	1.1043D-01	2.2309D-03	5.8439D-03	1.7907D-02	3.1080D-02
-4.6634D-03	-9.4467D-03	4.5624D-02	8.0064D-02	-6.8808D-02	6.5570D-02
5.1536D-02	7.9337D-02	1.7475D-03	1.3147D-03	-1.0844D-02	-9.4036D-03
-5.6383D-03	-8.9159D-03	4.1473D-02	6.0823D-02	-2.5411D-02	2.4569D-02
-3.5091D-02	-1.1875D-02	6.0994D-02	-7.2283D-02	3.5860D-02	8.1371D-02
6.9949D-02	-6.8249D-02	-7.6585D-02	-3.4693D-02	-2.0114D-02	4.7813D-02
-2.1056D-02	-1.6017D-02	4.6036D-02	-5.3496D-02	-3.3446D-04	3.3209D-02
4.7518D-02	-5.3286D-02	-5.3881D-02	-2.9003D-02	1.5647D-02	1.4565D-02
6.3219D-03	4.9194D-03	9.7842D-03	8.3693D-03	-1.1604D-02	-1.6544D-03
-6.3740D-03	-5.3965D-03	9.8130D-03	6.9069D-03	1.3031D-03	1.1880D-02
6.3360D-03	6.0678D-03	-9.1233D-03	8.3141D-03	7.5006D-03	-8.4496D-03
-6.4137D-03	1.1237D-02	-2.1224D-04	6.7253D-03	-1.0833D-02	-4.4994D-03
6.3396D-03	-1.0889D-02	-6.6983D-04	8.4470D-03	4.3748D-03	1.1062D-02
-6.4063D-03	-5.7683D-03	-9.5953D-03	6.8726D-03	9.7433D-03	-6.3974D-03
6.4353D-02	2.0360D-03	1.0283D-01	-8.7571D-02	-8.3280D-02	-4.7006D-02
9.7359D-02	-9.2736D-02	9.1908D-02	5.9801D-02	7.2406D-02	-1.7770D-02
4.6000D-02	9.1386D-03	8.1297D-02	-6.8419D-02	-3.5751D-02	-1.2890D-03
6.2429D-02	-7.1341D-02	6.1744D-02	4.2042D-02	1.6382D-02	1.9502D-02

-1.1639D-01	-1.5320D-01	-3.0946D-03	-7.7045D-03	-2.1820D-02	-3.7856D-02
6.9464D-03	1.3105D-02	-6.3287D-02	-1.0556D-01	8.3841D-02	-7.9850D-02
-7.6765D-02	-1.1006D-01	-2.4240D-03	-1.7333D-03	1.3214D-02	1.1452D-02
8.3985D-03	1.2369D-02	-5.7529D-02	-8.0189D-02	3.0962D-02	-2.9919D-02
5.2269D-02	1.6474D-02	-8.4608D-02	9.5297D-02	-4.3695D-02	-9.9092D-02
-1.0419D-01	9.4682D-02	1.0623D-01	4.5739D-02	2.4509D-02	-5.8226D-02
3.1363D-02	2.2221D-02	-6.3859D-02	7.0528D-02	4.0754D-04	-4.0442D-02
-7.0781D-02	7.3924D-02	7.4741D-02	3.8237D-02	-1.9066D-02	-1.7737D-02
-9.4167D-03	-6.8247D-03	-1.3572D-02	-1.1034D-02	1.4139D-02	2.0147D-03
9.4943D-03	7.4866D-03	-1.3612D-02	-9.1059D-03	-1.5878D-03	-1.4467D-02
-9.4378D-03	-8.4179D-03	1.2655D-02	-1.0961D-02	-9.1393D-03	1.0290D-02
9.5534D-03	-1.5589D-02	2.9440D-04	-8.8666D-03	1.3200D-02	5.4794D-03
-9.4431D-03	1.5107D-02	9.2915D-04	-1.1136D-02	-5.3307D-03	-1.3471D-02
9.5425D-03	8.0023D-03	1.3310D-02	-9.0607D-03	-1.1872D-02	7.7907D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
4.6782D-02	7.3317D-02	-7.4737D-03	1.7045D-02	1.4198D-02	6.1368D-03
-5.3206D-02	-3.1085D-02	2.1859D-02	-8.6866D-03	2.5143D-02	1.8172D-02
4.1302D-02	7.2430D-02	-7.1084D-03	-4.7441D-02	-1.7074D-02	2.9135D-02
-4.4551D-02	-2.4926D-02	2.0415D-02	2.8101D-02	-2.5182D-02	5.0782D-02
2.7313D-03	2.6853D-02	1.2738D-02	2.5571D-02	1.3678D-02	-1.8792D-02
-9.4110D-02	4.2039D-02	4.9906D-03	-9.3967D-03	1.6858D-02	-3.4580D-03
7.7097D-03	2.2003D-02	1.3156D-02	-2.5683D-02	-1.4900D-02	-5.9041D-02
-8.7937D-02	3.7950D-02	1.4989D-03	2.9650D-02	-4.6383D-02	-6.1938D-04
1.4499D-02	5.6329D-02	7.4192D-02	2.0894D-02	6.3253D-03	1.2226D-02
-2.2903D-02	1.7631D-02	3.8926D-02	-1.6615D-02	2.1623D-02	-1.4123D-02
1.0852D-02	4.7576D-02	6.8806D-02	-3.5080D-02	-3.5218D-02	2.9206D-02
-2.2770D-02	1.7587D-02	4.2765D-02	9.9071D-03	-3.6653D-02	-5.1069D-02
1.5907D-02	-2.0521D-03	1.9743D-02	-1.7722D-02	-2.1182D-02	2.3062D-02
8.9491D-03	-2.2870D-02	9.2199D-03	2.6529D-02	6.6054D-03	-2.2376D-02
-8.3248D-03	-8.0280D-03	2.2756D-02	2.7238D-02	-4.8071D-03	2.3113D-02
1.4906D-02	-1.9032D-03	2.1505D-02	-1.8824D-02	2.0117D-02	-2.2176D-02
7.0112D-03	-2.2824D-02	8.3169D-03	-9.4694D-03	2.5713D-02	2.3331D-02
-8.4091D-03	-1.0214D-02	2.2988D-02	-7.6567D-03	-2.5934D-02	-2.2640D-02
-5.6175D-02	-8.8000D-02	8.9654D-03	-1.8430D-02	-1.5344D-02	-6.5441D-03
6.3890D-02	3.7311D-02	-2.6222D-02	9.3927D-03	-2.7173D-02	-1.9378D-02
-4.9595D-02	-8.6935D-02	8.5272D-03	5.1297D-02	1.8453D-02	-3.1068D-02
5.3496D-02	2.9918D-02	-2.4490D-02	-3.0385D-02	2.7215D-02	-5.4152D-02
-3.2797D-03	-3.2231D-02	-1.5281D-02	-2.7650D-02	-1.4783D-02	2.0039D-02
1.1301D-01	-5.0458D-02	-5.9866D-03	1.0160D-02	-1.8219D-02	3.6875D-03
-9.2578D-03	-2.6410D-02	-1.5782D-02	2.7771D-02	1.6103D-02	6.2960D-02
1.0559D-01	-4.5550D-02	-1.7980D-03	-3.2060D-02	5.0128D-02	6.6049D-04
-1.7410D-02	-6.7609D-02	-8.9000D-02	-2.2593D-02	-6.8360D-03	-1.3038D-02
2.7501D-02	-2.1161D-02	-4.6695D-02	1.7966D-02	-2.3368D-02	1.5060D-02
-1.3031D-02	-5.7104D-02	-8.2540D-02	3.7932D-02	3.8062D-02	-3.1145D-02

2.7342D-02	-2.1109D-02	-5.1300D-02	-1.0712D-02	3.9612D-02	5.4459D-02
-1.9101D-02	2.4630D-03	-2.3684D-02	1.9162D-02	2.2892D-02	-2.4593D-02
-1.0746D-02	2.7450D-02	-1.1060D-02	-2.8685D-02	-7.1388D-03	2.3862D-02
9.9964D-03	9.6358D-03	-2.7298D-02	-2.9452D-02	5.1952D-03	-2.4647D-02
-1.7899D-02	2.2844D-03	-2.5797D-02	2.0354D-02	-2.1741D-02	2.3648D-02
-8.4190D-03	2.7395D-02	-9.9770D-03	1.0239D-02	-2.7789D-02	-2.4880D-02
1.0098D-02	1.2260D-02	-2.7576D-02	8.2791D-03	2.8028D-02	2.4142D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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Columns 19 thru 24

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-8.3001D-03	-1.8131D-03	1.0828D-03	-3.1327D-02	-9.8702D-03	7.3785D-04
-3.5071D-03	1.4017D-02	5.7754D-03	-9.9758D-03	3.1060D-02	1.8668D-03
-1.0423D-02	3.8122D-02	-5.5812D-02	2.8119D-02	3.5522D-02	3.3006D-03
-3.7544D-02	5.3773D-02	3.1888D-02	-2.4419D-02	-1.2691D-02	5.6131D-03
-1.3585D-02	-4.0026D-04	-4.6213D-03	-3.1372D-02	-1.0088D-02	-2.2978D-03
-4.9659D-03	9.0758D-03	-9.5488D-04	-9.6273D-03	3.1204D-02	-5.5227D-04
-7.5165D-02	3.6323D-04	1.1290D-03	-8.9979D-03	-3.0020D-03	-6.1507D-03
1.1141D-04	-1.0978D-02	-6.5025D-02	1.2107D-02	-4.9445D-02	4.0723D-04
-1.2064D-02	-5.6584D-03	4.1600D-03	-3.0967D-02	-9.9445D-03	8.8831D-04
1.1688D-04	1.0299D-02	-2.6459D-03	-9.9532D-03	3.1402D-02	-1.8406D-03
-1.0328D-02	-3.8010D-02	5.4443D-02	4.2633D-02	-1.7770D-02	4.1175D-03
3.8246D-02	5.3467D-02	3.3040D-02	2.7145D-02	1.2575D-03	-5.8182D-03
4.3575D-03	-7.1728D-04	9.3220D-04	-8.0162D-03	1.8954D-03	-1.7158D-02
-4.6595D-03	4.9484D-04	-2.5163D-04	5.9604D-03	5.7310D-03	1.7423D-02
-2.9288D-03	-3.6242D-03	8.4800D-04	5.7753D-03	5.9965D-03	-1.7517D-02
2.9662D-03	4.0046D-03	-3.1790D-04	2.1531D-03	-8.0891D-03	1.7433D-02
-1.9576D-03	4.1482D-03	7.9334D-04	2.1311D-03	-8.0465D-03	-1.7471D-02
2.0237D-03	-4.3931D-03	-3.1723D-04	-8.0156D-03	2.3825D-03	1.7320D-02
7.6758D-03	1.6761D-03	-9.6199D-04	2.7496D-02	8.6611D-03	-6.0322D-04
3.2433D-03	-1.2958D-02	-5.1312D-03	8.7557D-03	-2.7255D-02	-1.5262D-03
9.6395D-03	-3.5242D-02	4.9587D-02	-2.4680D-02	-3.1170D-02	-2.6984D-03
3.4720D-02	-4.9711D-02	-2.8331D-02	2 1432D-02	1.1137D-02	-4.5889D-03
1.2563D-02	3.7002D-04	4.1058D-03	2.7535D-02	8.8520D-03	1.8786D-03
4.5924D-03	-8.3902D-03	8.4838D-04	8.4498D-03	-2.7381D-02	4.5151D-04
6.9512D-02	-3.3579D-04	-1.0031D-03	7.8973D-03	2.6342D-03	5.0285D-03
-1.0303D-04	1.0149D-02	5.7772D-02	-1.0626D-02	4.3388D-02	-3.3293D-04
1.1157D-02	5.2309D-03	-3.6960D-03	2.7179D-02	8.7263D-03	-7.2623D-04
-1.0809D-04	-9.5206D-03	2.3508D-03	8.7358D-03	-2.7555D-02	1.5048D-03
9.5513D-03	3.5138D-02	-4.8370D-02	-3.7418D-02	1.5593D-02	-3.3662D-03
-3.5370D-02	-4.9428D-02	-2.9355D-02	-2.3825D-02	-1.1034D-03	4.7566D-03
-4.0298D-03	6.6309D-04	-8.2823D-04	7.0358D-03	-1.6632D-03	1.4028D-02
4.3091D-03	-4.5746D-04	2.2356D-04	-5.2314D-03	-5.0290D-03	-1.4244D-02
2.7086D-03	3.3504D-03	-7.5342D-04	-5.0689D-03	-5.2619D-03	1.4321D-02
-2.7431D-03	-3.7020D-03	2.8344D-04	-1.8897D-03	7.0982D-03	-1.4253D-02
1.8103D-03	-3.8348D-03	-7.0485D-04	-1.8705D-03	7.0608D-03	1.4283D-02
-1.8715D-03	4.0612D-03	2.8185D-04	7.0352D-03	-2.0906D-03	-1.4160D-02

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Columns 25 thru 30

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-3.6386D-02	-1.4603D-02	-1.1422D-02	-4.7023D-02	4.1627D-03	-4.6471D-02
1.5045D-02	1.3587D-02	-1.7748D-02	-7.3841D-02	-2.9349D-02	8.7123D-03
4.3272D-02	3.2112D-02	1.4759D-02	5.4213D-02	-9.9382D-03	4.9124D-02
-3.4807D-02	6.4824D-03	2.4990D-02	9.0835D-02	2.3656D-02	-1.3477D-02
-6.0903D-03	-2.1052D-03	2.0704D-02	8.7547D-02	1.0527D-03	-2.8733D-02
2.4402D-03	4.3491D-02	-1.2158D-03	-4.1793D-03	-4.7694D-02	6.7162D-03
-2.3617D-02	3.4135D-03	-2.8475D-02	-1.0587D-01	-2.2673D-03	2.1409D-02
-5.6894D-03	-5.9833D-02	5.2590D-04	1.9388D-03	5.2790D-02	-7.2749D-03
-3.2465D-02	1.7499D-02	-9.6936D-03	-3.9861D-02	-1.3275D-02	-3.9881D-02
-1.6919D-02	1.7393D-02	1.8686D-02	7.7670D-02	-3.6701D-02	-6.5039D-03
3.5504D-02	-3.9236D-02	1.4430D-02	5.0877D-02	1.9300D-02	4.1205D-02
3.6900D-02	-1.4760D-03	-2.5369D-02	-9.2357D-02	3.2690D-02	1.2399D-02
-8.5824D-03	-7.9998D-03	-7.4330D-03	2.1215D-03	-2.7845D-02	1.5367D-02
6.7931D-03	-9.0046D-03	7.4310D-03	-1.8941D-03	-3.1567D-02	-6.9038D-03
-2.3460D-03	1.1405D-02	-7.2806D-03	2.1842D-03	2.7203D-02	1.6773D-02
-1.1512D-02	-1.3166D-03	7.6794D-03	-1.9815D-03	9.8698D-03	3.0715D-02
1.1388D-02	-3.8226D-03	-7.5880D-03	2.3658D-03	8.9026D-04	-3.1924D-02
4.2311D-03	1.0917D-02	7.6511D-03	-1.6629D-03	2.1614D-02	-2.3809D-02
2.9274D-02	1.1746D-02	8.4941D-03	3.4102D-02	-2.9718D-03	3.3154D-02
-1.2105D-02	-1.0929D-02	1.3198D-02	5.3551D-02	2.0953D-02	-6.2157D-03
-3.4815D-02	-2.5830D-02	-1.0976D-02	-3.9316D-02	7.0951D-03	-3.5047D-02
2.8004D-02	-5.2141D-03	-1.8584D-02	-6.5875D-02	-1.6889D-02	9.6154D-03
4.8999D-03	1.6933D-03	-1.5396D-02	-6.3491D-02	-7.5158D-04	2.0500D-02
-1.9633D-03	-3.4982D-02	9.0408D-04	3.0309D-03	3.4050D-02	-4.7917D-03
1.9001D-02	-2.7457D-03	2.1175D-02	7.6776D-02	1.6187D-03	-1.5274D-02
4.5774D-03	4.8127D-02	-3.9108D-04	-1.4061D-03	-3.7688D-02	5.1902D-03
2.6120D-02	-1.4075D-02	7.2086D-03	2.8908D-02	9.4775D-03	2.8453D-02
1.3612D-02	-1.3990D-02	-1.3896D-02	-5.6328D-02	2.6202D-02	4.6401D-03
-2.8565D-02	3.1560D-02	-1.0730D-02	-3.6897D-02	-1.3779D-02	-2.9397D-02
-2.9688D-02	1.1872D-03	1.8866D-02	6.6979D-02	-2.3338D-02	-8.8461D-03
6.9050D-03	6.4346D-03	5.5275D-03	-1.5385D-03	1.9879D-02	-1.0963D-02
-5.4654D-03	7.2429D-03	-5.5260D-03	1.3737D-03	2.2537D-02	4.9255D-03
1.8874D-03	-9.1738D-03	5.4142D-03	-1.5840D-03	-1.9421D-02	-1.1967D-02
9.2623D-03	1.0590D-03	-5.7107D-03	1.4370D-03	-7.0463D-03	-2.1913D-02
-9.1619D-03	3.0747D-03	5.6427D-03	-1.7158D-03	-6.3558D-04	2.2776D-02
-3.4041D-03	-8.7808D-03	-5.6897D-03	1.2060D-03	-1.5431D-02	1.6986D-02
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 0.0000D+00   0.0000D+00   0.0000D+00   0.0000D+00   0.0000D+00   0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
3.6814D-03	-5.0104D-02	3.5236D-02	1.8014D-02	2.7500D-02	2.5648D-02
-1.3201D-02	-7.7627D-02	-2.0728D-02	2.9516D-02	-1.4035D-02	-1.5067D-02
-2.4905D-03	7.0116D-02	-4.2816D-02	-1.7599D-02	-2.9075D-02	-2.0192D-02
1.7276D-02	1.1732D-01	2.8479D-02	-2.9358D-02	1.6140D-02	1.2228D-02
-8.4723D-02	-3.7755D-02	-1.2221D-03	-3.4599D-02	-3.1167D-03	3.4975D-02
-8.6210D-04	8.7678D-03	4.1669D-02	1.3827D-03	3.0008D-02	-1.7627D-02
1.2552D-01	5.6579D-02	-8.5842D-04	3.4452D-02	1.9878D-03	-3.4194D-02
3.6552D-03	-7.8928D-03	-5.1995D-02	-8.9817D-04	-3.2552D-02	1.4024D-02
-3.0352D-02	3.2840D-02	-3.3927D-02	1.6803D-02	-2.5529D-02	2.8850D-02
6.8666D-02	-4.4480D-02	-2.2835D-02	-2.9874D-02	-1.8833D-02	-2.4618D-02
5.0501D-02	-4.7886D-02	4.3608D-02	-1.7101D-02	2.7960D-02	-2.6421D-02
-9.9281D-02	6.5624D-02	2.6795D-02	2.9523D-02	1.8959D-02	2.5411D-02
-5.7635D-03	9.1300D-05	3.7071D-03	1.4657D-02	-2.8068D-02	4.6688D-03
1.4302D-03	4.8844D-03	2.8540D-03	-1.4977D-02	-2.8834D-02	-1.2713D-02
2.4336D-03	-5.0850D-03	3.1471D-03	1.3949D-02	-2.7886D-02	-1.1998D-02
-5.5770D-03	-1.2721D-03	2.3039D-03	-1.5073D-02	-2.7866D-02	5.2822D-03
3.6169D-03	4.8052D-03	3.4562D-03	1.3859D-02	-2.7873D-02	8.4645D-03
3.8820D-03	-3.7719D-03	2.2894D-03	-1.5004D-02	-2.8265D-02	7.6049D-03
-2.5177D-03	3.4265D-02	-2.3487D-02	-1.1315D-02	-1.6746D-02	-1.5436D-02
9.0276D-03	5.3087D-02	1.3816D-02	-1.8539D-02	8.5462D-03	9.0678D-03
1.7032D-03	-4.7950D-02	2.8539D-02	1.1054D-02	1.7705D-02	1.2153D-02
-1.1815D-02	-8.0232D-02	-1.8983D-02	1.8439D-02	-9.8281D-03	-7.3592D-03
5.7940D-02	2.5820D-02	8.1461D-04	2.1732D-02	1.8978D-03	-2.1050D-02
5.8958D-04	-5.9961D-03	-2.7775D-02	-8.6847D-04	-1.8273D-02	1.0609D-02
-8.5843D-02	-3.8693D-02	5.7219D-04	-2.1639D-02	-1.2104D-03	2.0579D-02
-2.4997D-03	5.3977D-03	3.4658D-02	5.6414D-04	1.9822D-02	-8.4401D-03
2.0757D-02	-2.2458D-02	2.2615D-02	-1.0554D-02	1.5546D-02	-1.7363D-02
-4.6959D-02	3.0419D-02	1.5221D-02	1.8763D-02	1.1468D-02	1.4817D-02
-3.4537D-02	3.2748D-02	-2.9067D-02	1.0741D-02	-1.7026D-02	1.5902D-02
6.7896D-02	-4.4878D-02	-1.7861D-02	-1.8543D-02	-1.1544D-02	-1.5294D-02
3.9415D-03	-6.2438D-05	-2.4710D-03	-9.2062D-03	1.7091D-02	-2.8099D-03
-9.7805D-04	-3.3403D-03	-1.9024D-03	9.4071D-03	1.7558D-02	7.6515D-03
-1.6643D-03	3.4775D-03	-2.0973D-03	-8.7612D-03	1.6980D-02	7.2213D-03
3.8140D-03	8.6997D-04	-1.5357D-03	9.4670D-03	1.6968D-02	-3.1791D-03
-2.4735D-03	-3.2861D-03	-2.3038D-03	-8.7047D-03	1.6972D-02	-5.0944D-03
-2.6548D-03	2.5795D-03	-1.5260D-03	9.4242D-03	1.7211D-02	-4.5770D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0:0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 37 thru 42

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5785D-03	1.0424D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.8581D-03	1.8925D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.7110D-04	-2.0338D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3109D-04	1.1814D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.9616D-03	9.9896D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.9374D-06	6.7967D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.8139D-06	-8.7829D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.7070D-03	1.0691D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.5796D-03	1.0202D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.8721D-03	-8.0545D-05
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.8489D-04	-7.8024D-05
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3138D-04	1.1595D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0687D-03	7.5833D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.7798D-03	-3.5213D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3943D-03	-2.4341D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-7.4777D-04	9.2239D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.3608D-03	8.5497D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.1804D-06	1.0966D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	6.3873D-06	-1.2435D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.9972D-04	1.0003D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0789D-03	7.8783D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.7601D-03	2.2200D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.4095D-03	-1.8608D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-7.4143D-04	9.4270D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	6.7344D-05	1.0137D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	9.7428D-04	1.0073D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.4496D-05	-7.5626D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	8.3109D-05	1.1821D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.6682D-03	-9.3252D-06
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	8.4728D-03	-2.4349D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.4531D-02	-2.4506D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	3.0897D-05	-3.6049D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.9590D-04	3.5260D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.3667D-02	-2.4214D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	5.7904D-02	-2.4385D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.3267D-02	-2.3803D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-5.8165D-02	-2.0509D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	6.7050D-02	-2.4962D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.1477D-04	-2.6068D-03
-2.2653D-02	9.5145D-03	-4.0443D-04	-9.0460D-02	3.2233D+01	8.0021D+01
-3.2196D-02	7.5049D-03	8.5463D-03	-1.4308D-01	5.7331D+01	-1.3277D+01
2.1927D-02	-5.8785D-03	-6.0219D-03	8.5633D-02	1.0225D+02	2.0828D+02
3.1533D-02	-1.2395D-02	-7.4480D-03	1.3430D-01	1.8086D+02	7.9229D+00
-2.0702D-02	-3.2668D-03	1.2299D-02	1.6508D-01	-6.5575D+01	5.2608D+01

-2.5329D-02	-5.4449D-03	-2.1172D-03	-7.1405D-03	-1.0260D+00	1.0574D+01
2.0547D-02	3.8713D-03	-1.5472D-02	-1.5500D-01	-2.0705D+02	1.9921D+02
2.0237D-02	-2.5665D-03	3.7197D-04	7.2359D-03	-2.4089D+00	2.4399D+01
-1.2717D-02	-5.9919D-03	-3.8158D-03	-7.7862D-02	3.3958D+01	8.6001D+01
-3.0963D-02	8.9670D-03	-5.1384D-03	1.4784D-01	-5.6331D+01	2.4017D+01
8.1306D-03	5.5130D-03	-3.5469D-03	7.2552D-02	1.0640D+02	2.1528D+02
2.7489D-02	-1.2981D-02	2.1404D-03	-1.3935D-01	-1.7853D+02	2.8629D+01
-1.0971D-02	-2.2111D-03	3.5590D-02	-2.8423D-02	-2.2748D+00	-5.3765D+01
-3.0293D-04	1.1363D-02	-3.2944D-02	2.7823D-02	2.3794D+00	3.5033D+01
4.2858D-03	3.2342D-02	-1.5334D-02	-2.7988D-02	-1.5045D+00	1.0347D+02
1.1921D-02	-3.4918D-02	7.0308D-03	2.6232D-02	2.3690D+00	6.6612D+01
1.0277D-02	-2.9293D-02	-1.9926D-02	-2.8002D-02	-2.4295D+00	-4.9599D+01
-9.1145D-03	2.3042D-02	2.7263D-02	2.7074D-02	1.5304D+00	-1.0164D+02
1.3631D-02	-5.4971D-03	2.3332D-04	4.9903D-02	0.0000D+00	0.0000D+00
1.9373D-02	-4.3360D-03	-4.9305D-03	7.8937D-02	0.0000D+00	0.0000D+00
-1.3194D-02	3.3963D-03	3.4741D-03	-4.7245D-02	0.0000D+00	0.0000D+00
-1.8974D-02	7.1612D-03	4.2969D-03	-7.4093D-02	0.0000D+00	0.0000D+00
1.2457D-02	1.8874D-03	-7.0954D-03	-9.1078D-02	0.0000D+00	0.0000D+00
1.5241D-02	3.1458D-03	1.2215D-03	3.9395D-03	0.0000D+00	0.0000D+00
-1.2364D-02	-2.2367D-03	8.9261D-03	8.5515D-02	0.0000D+00	0.0000D+00
-1.2177D-02	1.4828D-03	-2.1460D-04	-3.9921D-03	0.0000D+00	0.0000D+00
7.6521D-03	3.4619D-03	2.2014D-03	4.2958D-02	0.0000D+00	0.0000D+00
1.8631D-02	-5.1808D-03	2.9644D-03	-8.1565D-02	0.0000D+00	0.0000D+00
-4.9225D-03	-3.1881D-03	2.0463D-03	-4.0028D-02	0.0000D+00	0.0000D+00
-1.6541D-02	7.4997D-03	-1.2348D-03	7.6883D-02	0.0000D+00	0.0000D+00
6.6018D-03	1.2775D-03	-2.0532D-02	1.5681D-02	0.0000D+00	0.0000D+00
1.8228D-04	-6.5650D-03	1.9006D-02	-1.5350D-02	0.0000D+00	0.0000D+00
-2.5789D-03	-1.8686D-02	8.8463D-03	1.5441D-02	0.0000D+00	0.0000D+00
-7.1730D-03	2.0174D-02	-4.0562D-03	-1.4473D-02	0.0000D+00	0.0000D+00
-6.1840D-03	1.6924D-02	1.1496D-02	1.5449D-02	0.0000D+00	0.0000D+00
5.4845D-03	-1.3313D-02	-1.5728D-02	-1.4937D-02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3623D-02	-2.5727D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.4230D-02	4.2685D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.3212D-02	-6.6964D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-7.6436D-02	-2.5473D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.7714D-02	-1.6914D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	4.3360D-04	-3.3997D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	8.7506D-02	-6.4048D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0181D-03	-7.8443D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.4352D-02	-2.7650D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	2.3807D-02	-7.7215D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.4968D-02	-6.9215D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	7.5453D-02	-9.2044D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	9.6138D-04	1.7286D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0056D-03	-1.1263D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	6.3586D-04	-3.3267D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.0012D-03	-2.1416D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0268D-03	1.5946D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-6.4678D-04	3.2676D-02

Columns 43 thru 48

3.0356D-05	-1.2267D-02	1.5086D-03	8.9732D-04	3.9907D-03	7.7407D-03
-9.0375D-03	-2.1073D-03	1.0080D-02	7.0749D-04	-7.3509D-03	7.3814D-03
1.0465D-02	7.1948D-03	-8.7078D-03	-3.5375D-04	5.6868D-03	-8.6183D-03
2.0097D-04	-1.7066D-02	6.5081D-03	4.2241D-04	3.0236D-03	9.5989D-03
1.0156D-03	-8.1380D-03	1.3307D-02	-1.6187D-04	-5.7564D-03	1.2797D-03
-6.9868D-03	1.0454D-02	6.5385D-03	1.2296D-02	-4.6448D-04	1.6449D-05
8.8542D-03	-5.5254D-03	-3.5372D-03	-1.3432D-02	6.7253D-04	4.2702D-05
1.1069D-03	-1.3211D-02	2.1559D-02	-2.6574D-04	-1.4654D-02	-1.2262D-03
2.0346D-03	4.2973D-03	1.1620D-02	-1.0427D-03	4.3623D-03	7.4447D-03
-9.2576D-03	7.9837D-03	-6.4205D-03	9.2118D-04	7.1380D-03	-7.3334D-03
1.0679D-02	-4.4577D-03	1.0326D-02	-5.8418D-04	-5.4651D-03	8.4825D-03
2.1611D-03	2.0076D-03	1.8171D-02	-6.9181D-04	3.3969D-03	9.1927D-03
2.0602D-03	1.3637D-02	1.6871D-03	-9.9574D-03	3.2778D-03	-4.8308D-03
-9.3791D-03	-7.2491D-04	-1.4843D-02	-6.0999D-03	-4.7174D-03	-3.5653D-03
1.0341D-02	7.2150D-03	2.0846D-02	6.9761D-03	1.2318D-02	2.9914D-03
1.7324D-03	1.1590D-02	8.3296D-03	-1.1067D-02	7.9090D-03	-6.3573D-03
8.4431D-04	4.7668D-03	-7.7364D-03	7.0397D-05	-8.3459D-03	-5.1770D-03
-1.0884D-02	-1.1288D-02	-6.9094D-03	-1.7977D-03	2.0547D-04	1.6907D-04
1.2269D-02	1.7802D-02	1.0901D-02	1.5768D-03	-2.0728D-04	-2.9484D-04
9.9126D-04	2.5584D-03	-4.1585D-03	4.7716D-05	-6.4157D-03	-5.4388D-03
-5.2384D-04	-7.7743D-03	-1.1209D-02	1.0052D-02	2.4854D-03	-4.8360D-03
-9.0832D-03	-1.3485D-02	6.0081D-03	-6.3160D-03	5.1867D-03	3.4976D-03
1.0138D-02	2.1783D-02	-2.9160D-03	7.1933D-03	-1.2997D-02	-2.8957D-03
1.4337D-04	-1.2785D-02	-6.3718D-03	1.1062D-02	6.7562D-03	-6.2633D-03
1.0130D-03	-2.2179D-03	3.6563D-03	-1.4325D-05	1.0606D-05	6.5971D-03
-1.0137D-02	-3.6623D-03	-2.2103D-03	-1.0042D-04	-1.7850D-03	5.9033D-05
1.1819D-02	9.4525D-03	8.3023D-03	1.1783D-04	-2.1600D-05	2.2661D-03
1.5333D-03	-4.9135D-03	1.1551D-02	-6.4152D-04	1.3115D-04	8.9875D-03
-7.1080D-07	-5.7103D-06	-4.2335D-06	-1.2559D-05	-3.0240D-03	-6.6596D-06
-2.5705D-03	6.2355D-03	-9.9593D-03	1.0503D-04	4.7922D-03	5.8062D-03
2.4261D-02	9.9442D-03	6.1583D-03	2.7816D-04	-7.9731D-03	-1.0378D-03
3.5196D-02	-2.8392D-02	-1.7333D-02	-8.6633D-04	8.9992D-04	-1.6631D-03
3.5376D-03	1.7381D-02	-2.3410D-02	2.5183D-04	7.8272D-04	-7.8470D-03
-2.6149D-03	5.9330D-03	-9.9141D-03	2.4414D-04	-1.8811D-02	6.0649D-03
2.4142D-02	9.9012D-03	6.3762D-03	4.9984D-04	3.1170D-02	-2.2244D-03
-2.2651D-03	6.2732D-03	-9.6789D-03	-1.2425D-04	-1.7457D-02	5.5915D-03
2.4711D-02	1.0104D-02	6.1203D-03	3.4344D-04	-3.1986D-02	-3.2849D-04
-2.1980D-03	6.3352D-03	-1.0152D-02	2.0730D-04	3.6551D-02	7.5760D-03
2.4119D-02	9.7217D-03	6.0470D-03	8.1302D-05	7.7502D-04	-8.6363D-04
2.6879D+01	5.3819D+02	8.3996D+01	-5.2226D+02	-1.8128D+03	-6.6116D+01
-6.5458D+01	8.8844D+02	-1.1270D+01	3.3284D+02	-2.7425D+03	3.0116D+03
3.0983D+01	5.3660D+02	-4.2454D+02	-2.1357D+02	-1.2958D+03	-2.9677D+02
-2.0627D+02	8.6639D+02	2.8453D+02	1.5153D+02	-1.7586D+03	2.3167D+03
3.8155D+00	5.4771D+02	-8.8398D+02	1.4879D+01	3.2785D+03	4.9752D+03
-9.3763D+01	-5.0369D+01	-2.8477D+01	-6.1940D+02	-1.9567D+02	-4.2559D+02
1.6618D+01	5.3909D+02	-8.6373D+02	1.6410D+01	2.1624D+03	3.5742D+03
-2.1773D+02	4.3745D+02	2.7884D+02	-2.4192D+02	-2.3658D+02	-4.0167D+02
-9.3215D+00	-3.1295D+02	-4.2543D+02	5.2236D+02	-1.4724D+03	-5.3499D+02
-5.9273D+01	3.8560D+02	8.1335D+02	3.3131D+02	2.9350D+03	-3.0747D+03
1.3384D+01	1.4961D+02	-6.5483D+02	2.1982D+02	-8.8348D+02	-7.2160D+02

-1.9868D+02	6.3776D+02	6.6238D+02	1.5847D+02	1.9938D+03	-2.4006D+03
8.8336D+01	3.3475D+02	3.7647D+02	-9.7069D+01	2.6526D+02	2.2163D+02
9.7103D+01	4.8909D+02	1.2550D+02	-9.4596D+01	-2.6745D+02	-2.4312D+02
2.3655D+00	-4.8776D+02	1.0055D+02	-1.2270D+02	2.6585D+02	2.7337D+02
-7.8972D+01	-3.4798D+02	3.5957D+02	-1.1692D+02	-2.6911D+02	5.0625D+02
-9.0822D+01	1.6194D+02	-4.7464D+02	-1.0695D+02	2.6600D+02	-4.9057D+02
-1.8274D+01	-1.3222D+02	-4.8273D+02	-1.1638D+02	-2.6880D+02	-2.5987D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-8.6415D-03	-4.0065D-02	-6.2510D-03	3.7824D-02	6.4353D-02	2.0360D-03
2.1044D-02	-6.6139D-02	8.3870D-04	-2.4105D-02	9.7359D-02	-9.2736D-02
-9.9608D-03	-3.9946D-02	3.1594D-02	1.5467D-02	4.6000D-02	9.1386D-03
6.6314D-02	-6.4497D-02	-2.1174D-02	-1.0974D-02	6.2429D-02	-7.1341D-02
-1.2267D-03	-4.0773D-02	6.5786D-02	-1.0776D-03	-1.1639D-01	-1.5320D-01
3.0144D-02	3.7497D-03	2.1193D-03	4.4859D-02	6.9464D-03	1.3105D-02
-5.3425D-03	-4.0132D-02	6.4279D-02	-1.1884D-03	-7.6765D-02	-1.1006D-01
7.0000D-02	-3.2565D-02	-2.0751D-02	1.7521D-02	8.3985D-03	1.2369D-02
2.9968D-03	2.3297D-02	3.1660D-02	-3.7831D-02	5.2269D-02	1.6474D-02
1.9056D-02	-2.8706D-02	-6.0530D-02	-2.3994D-02	-1.0419D-01	9.4682D-02
-4.3029D-03	-1.1138D-02	4.8732D-02	-1.5920D-02	3.1363D-02	2.2221D-02
6.3874D-02	-4.7477D-02	-4.9295D-02	-1.1477D-02	-7.0781D-02	7.3924D-02
-2.8400D-02	-2.4920D-02	-2.8017D-02	7.0300D-03	-9.4167D-03	-6.8247D-03
-3.1218D-02	-3.6410D-02	-9.3400D-03	6.8509D-03	9.4943D-03	7.4866D-03
-7.6050D-04	3.8311D-02	-7.4827D-03	8.8863D-03	-9.4378D-03	-8.4179D-03
2.5389D-02	2.5905D-02	-2.6759D-02	8.4678D-03	9.5534D-03	-1.5589D-02
2.9199D-02	-1.2056D-02	3.5323D-02	7.7459D-03	-9.4431D-03	1.5107D-02
5.8752D-03	9.8429D-03	3.5925D-02	8.4289D-03	9.5425D-03	8.0023D-03

Columns 49 thru 54

-7.2299D-03	1.0373D-02	1.1342D-03	-1.0894D-02	-1.7193D-03	-1.8445D-03
1.0240D-03	5.0175D-03	-7.9429D-03	-4.3299D-03	9.0422D-03	1.6155D-03
-6.4876D-04	-5.7747D-03	1.4519D-02	4.3295D-03	-1.5342D-02	-2.2653D-03
-8.3176D-03	1.1574D-02	4.3044D-03	-1.3624D-02	-4.2684D-03	-4.3105D-03
-3.4219D-05	-7.9755D-04	-7.4147D-03	-8.5877D-03	3.2604D-03	6.9644D-03
6.8861D-03	1.1322D-02	6.6703D-03	-5.2567D-03	-1.4605D-03	-1.6691D-03

-8.0311D-03	-1.7576D-02	-6.3262D-03	4.6771D-03	8.2174D-06	4.4135D-03
-7.5527D-06	-1.5386D-03	-8.1208D-03	-9.7983D-03	2.6327D-03	4.4838D-03
7.4826D-03	-9.7279D-03	-1.1871D-02	1.4416D-04	8.3285D-03	2.0631D-02
7.9306D-04	6.5578D-03	4.3980D-03	8.2095D-03	1.9521D-03	-1.7204D-02
-3.1754D-04	-7.2535D-03	-3.5826D-03	-1.4537D-02	-5.9653D-03	2.2545D-02
8.7758D-03	-1.0981D-02	-1.5124D-02	2.8526D-03	1.0241D-02	2.1924D-02
3.5031D-03	-9.5146D-03	-6.7493D-03	-6.2641D-03	3.0037D-03	5.7102D-03
7.7366D-04	-6.3082D-03	9.0062D-03	-5.7763D-03	-7.9196D-03	5.7247D-04
-2.9008D-03	1.0087D-02	-1.0285D-02	5.6022D-03	6.1952D-03	-2.5874D-03
2.8508D-03	-1.4556D-02	-7.1835D-03	-5.7470D-03	7.7258D-04	7.8935D-03
-6.1312D-05	-8.0150D-04	5.3055D-03	5.5072D-03	-2.4463D-03	-7.8855D-03
-1.1856D-02	-1.1693D-02	9.1986D-03	-8.7680D-03	-2.3109D-02	1.7674D-02
1.4345D-02	1.3127D-02	-1.1020D-02	1.0544D-02	2.5631D-02	-2.0783D-02
-5.6334D-05	-7.0170D-04	1.0243D-02	1.0984D-02	-4.7121D-03	-1.3736D-02
-3.5157D-03	1.0160D-02	-4.9528D-03	-7.9154D-03	4.2481D-04	1.8902D-03
7.4261D-04	-5.0882D-03	7.2534D-03	-7.4857D-03	-6.5976D-03	5.3409D-03
-2.9447D-03	7.5391D-03	-7.4684D-03	8.6849D-03	5.8312D-03	-5.9517D-03
-2.9749D-03	1.5985D-02	-4.0637D-03	-8.4772D-03	2.4560D-03	-1.3380D-03
9.0484D-05	1.6222D-04	1.6255D-02	1.9024D-02	-6.7588D-03	-1.5152D-02
-6.5863D-03	-6.6380D-05	-1.9366D-02	1.5583D-02	1.6751D-02	-4.1435D-03
8.3209D-03	-4.2713D-04	2.9528D-02	-1.5152D-02	-2.5121D-02	1.8281D-03
1.9358D-03	-1.2123D-03	2.7308D-02	2.5160D-02	-1.3397D-02	-2.2004D-02
-7.0427D-06	-2.9190D-04	-3.6178D-05	-1.7689D-05	4.9815D-05	-6.3885D-05
-9.7088D-04	2.4951D-04	2.9874D-03	3.4559D-03	6.1691D-03	1.4116D-02
-5.8517D-03	-3.3466D-04	-3.1011D-03	3.3314D-03	-1.4729D-02	3.3662D-03
-7.8036D-03	9.7685D-06	-2.8168D-02	2.5920D-02	-1.1370D-02	3.1250D-03
1.8944D-03	-1.2422D-04	-2.5350D-02	-2.8905D-02	-6.0873D-03	-1.1304D-02
-4.1898D-05	-1.4363D-03	3.0575D-03	3.9124D-03	6.0640D-03	1.3748D-02
-6.7314D-03	1.1492D-03	-3.1126D-03	1.8971D-03	-1.3822D-02	1.6907D-03
-1.9628D-03	-2.9333D-04	2.1355D-03	2.7310D-03	5.0821D-03	1.2276D-02
-7.1938D-03	-1.7985D-03	-4.2754D-03	2.8899D-03	-1.5750D-02	1.8416D-03
-1.4544D-03	1.6771D-03	1.5654D-03	4.2020D-03	3.8989D-03	1.3684D-02
-5.2854D-03	6.7344D-04	-2.8942D-03	3.3952D-03	-1.4124D-02	3.5238D-03
-3.3399D+03	3.1489D+03	3.5057D+03	1.9810D+03	2.4349D+03	3.8177D+03
-2.9853D+03	-2.1503D+03	-3.0480D+03	7.4892D+02	-2.7693D+03	-1.6187D+03
-2.6407D+03	2.4602D+03	1.5050D+03	5.4322D+01	2.1497D+03	3.7715D+03
-2.0055D+03	-1.5117D+03	-6.8960D+02	-8.2190D+02	-2.3188D+03	-1.2979D+03
1.0052D+02	2.7704D+02	9.1853D+02	1.5954D+03	1.4216D+02	1.3983D+03
2.0557D+03	3.7956D+03	-3.5294D+03	3.3652D+03	-4.8983D+03	2.1890D+03
7.8734D+01	6.2326D+01	-5.5624D+02	-4.8262D+02	4.0128D+02	1.1458D+03
1.8686D+03	2.8834D+03	-1.3034D+03	1.2609D+03	-4.5770D+03	1.9761D+03
2.7482D+03	-3.4267D+03	1.8394D+03	4.1762D+03	7.5466D+02	2.9331D+03
-3.4506D+03	-1.6447D+03	-1.0317D+03	2.4539D+03	-1.1921D+03	9.1806D+02
2.0742D+03	-2.5360D+03	-1.7156D+01	1.7044D+03	5.6485D+02	2.4774D+03
-2.4277D+03	-1.3749D+03	8.0259D+02	7.4752D+02	-1.1852D+03	9.1580D+02
4.4084D+02	3.9676D+02	-5.9520D+02	-8.4909D+01	8.2793D+02	-1.0686D+02
4.4214D+02	3.2743D+02	6.6841D+01	6.0970D+02	4.6579D+02	-1.1909D+03
-4.1107D+02	3.9414D+02	3.8473D+02	-4.3366D+02	-4.3330D+02	-4.1803D+02
-9.5626D+00	3.1882D+02	-5.5566D+02	-2.3092D+02	7.7582D+02	-9.9103D+01
-3.0180D+01	4.0044D+02	2.2440D+02	5.6771D+02	3.6493D+02	-1.1885D+03
-4.3233D+02	3.2580D+02	4.9976D+02	-3.2833D+02	-4.3769D+02	-5.3188D+02

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
1.0283D-01	-8.7571D-02	-8.3280D-02	-4.7006D-02	-5.6175D-02	-8.8000D-02
9.1908D-02	5.9801D-02	7.2406D-02	-1.7770D-02	6.3890D-02	3.7311D-02
8.1297D-02	-6.8419D-02	-3.5751D-02	-1.2890D-03	-4.9595D-02	-8.6935D-02
6.1744D-02	4.2042D-02	1.6382D-02	1.9502D-02	5.3496D-02	2.9918D-02
-3.0946D-03	-7.7045D-03	-2.1820D-02	-3.7856D-02	-3.2797D-03	-3.2231D-02
-6.3287D-02	-1.0556D-01	8.3841D-02	-7.9850D-02	1.1301D-01	-5.0458D-02
-2.4240D-03	-1.7333D-03	1.3214D-02	1.1452D-02	-9.2578D-03	-2.6410D-02
-5.7529D-02	-8.0189D-02	3.0962D-02	-2.9919D-02	1.0559D-01	-4.5550D-02
-8.4608D-02	9.5297D-02	-4.3695D-02	-9.9092D-02	-1.7410D-02	-6.7609D-02
1.0623D-01	4.5739D-02	2.4509D-02	-5.8226D-02	2.7501D-02	-2.1161D-02
-6.3859D-02	7.0528D-02	4.0754D-04	-4.0442D-02	-1.3031D-02	-5.7104D-02
7.4741D-02	3.8237D-02	-1.9066D-02	-1.7737D-02	2.7342D-02	-2.1109D-02
-1.3572D-02	-1.1034D-02	1.4139D-02	2.0147D-03	-1.9101D-02	2.4630D-03
-1.3612D-02	-9.1059D-03	-1.5878D-03	-1.4467D-02	-1.0746D-02	2.7450D-02
1.2655D-02	-1.0961D-02	-9.1393D-03	1.0290D-02	9.9964D-03	9.6358D-03
2.9440D-04	-8.8666D-03	1.3200D-02	5.4794D-03	-1.7899D-02	2.2844D-03
9.2915D-04	-1.1136D-02	-5.3307D-03	-1.3471D-02	-8.4190D-03	2.7395D-02
1.3310D-02	-9.0607D-03	-1.1872D-02	7.7907D-03	1.0098D-02	1.2260D-02

Columns 55 thru 60

2.9262D-02	1.6487D-02	3.5327D-03	9.5963D-03	1.4820D-02	-1.8383D-02
1.6534D-02	-1.6153D-02	1.5880D-02	-1.5052D-02	1.9141D-02	5.6528D-03
-1.8590D-02	1.9338D-02	-1.9810D-02	2.0009D-02	-2.1962D-02	-9.1793D-03
3.4251D-02	2.0488D-02	5.2613D-03	1.2680D-02	1.3993D-02	-2.0666D-02
4.5071D-03	-9.0919D-03	-5.3005D-03	-2.2069D-02	-2.3811D-02	4.6299D-05
5.6003D-03	-4.8157D-03	7.9562D-03	-3.5859D-04	-7.1120D-04	-1.5922D-02
-1.0161D-02	7.3961D-03	-1.2131D-02	4.4150D-04	7.9472D-04	1.5657D-02
3.6717D-03	-1.5531D-02	-9.0627D-03	-3.0871D-02	-2.7917D-02	3.1764D-05
-1.9481D-02	1.0181D-02	1.2418D-02	8.5928D-03	1.5848D-02	1.8388D-02
4.7792D-03	-6.8761D-03	2.1624D-02	1.6007D-02	-1.8035D-02	6.4735D-03
-3.3349D-03	8.9925D-03	-2.6123D-02	-2.1197D-02	2.0257D-02	-1.0101D-02
-2.5102D-02	1.3370D-02	1.5111D-02	1.1409D-02	1.5277D-02	2.1027D-02
-2.7786D-03	-8.6342D-04	9.5359D-03	1.1408D-02	5.4456D-03	-1.7389D-02

2.5661D-04	1.0173D-02	-2.2122D-04	-1.8731D-02	1.6955D-02	1.3701D-02
1.8615D-03	-1.6967D-02	1.2150D-03	2.6293D-02	-1.8622D-02	-1.6890D-02
-6.8886D-03	-2.1636D-03	1.5061D-02	1.5926D-02	4.1536D-03	-1.9033D-02
-3.9624D-03	2.1423D-02	1.3423D-02	-1.7984D-02	-1.6554D-02	8.9841D-04
-1.6556D-02	-6.1963D-03	1.0539D-02	-5.7581D-04	-1.4659D-04	-2.6072D-02
2.0521D-02	8.1937D-03	-1.3804D-02	7.1704D-04	-1.1703D-06	2.6837D-02
-7.2118D-03	2.5957D-02	1.6292D-02	-2.3864D-02	-2.1501D-02	1.2443D-03
6.3385D-03	8.1116D-03	-5.0774D-03	1.0599D-02	6.1106D-03	1.6622D-02
1.7960D-03	-4.3888D-03	-9.4503D-03	1.9082D-02	-1.7284D-02	1.4204D-02
1.8357D-03	6.7226D-03	1.6107D-02	-2.6699D-02	1.9075D-02	-1.7426D-02
9.3032D-03	1.2398D-02	-8.6941D-03	1.4860D-02	4.8374D-03	1.8204D-02
-8.2849D-03	-1.8264D-02	-1.1386D-02	-3.2639D-05	1.1311D-02	-3.1719D-04
-7.5566D-03	1.1273D-02	-1.8295D-02	-2.9014D-03	-2.2673D-04	-1.1350D-02
8.3605D-03	-2.1729D-02	1.9253D-02	4.9468D-05	4.4738D-03	9.8420D-04
-1.3719D-02	-3.0400D-02	-1.2204D-02	1.9676D-04	3.8145D-03	2.9329D-03
1.2751D-04	5.7915D-05	3.8904D-05	-4.6984D-03	2.7358D-05	-1.4154D-05
7.2954D-03	-8.9382D-03	-5.6932D-03	-2.5060D-03	-3.7892D-03	-2.6375D-04
6.4459D-03	5.2664D-03	-8.8792D-03	3.9051D-03	-2.4012D-04	3.6830D-03
4.8829D-03	-1.5504D-02	2.5359D-02	-5.9705D-04	-1.0208D-03	1.0647D-02
-4.6362D-03	-2.5360D-02	-1.5501D-02	-7.3363D-04	1.0899D-02	6.2126D-04
7.5597D-03	-8.2920D-03	-5.3398D-03	9.4787D-03	-4.0285D-03	-7.7918D-04
5.0712D-03	5.1006D-03	-7.7992D-03	-1.5388D-02	1.1274D-03	3.8854D-03
6.2836D-03	-8.0199D-03	-5.0287D-03	8.3568D-03	-3.1378D-03	5.5006D-04
6.1096D-03	5.5540D-03	-8.2652D-03	1.5917D-02	-2.9620D-04	4.7956D-03
7.4831D-03	-7.9912D-03	-5.2547D-03	-1.8194D-02	-4.6877D-03	6.8085D-04
5.9687D-03	5.0806D-03	-8.2765D-03	-7.3206D-04	-3.4978D-04	3.1775D-03
-3.8938D+02	9.8520D+02	8.2106D+02	3.5968D+02	-5.6095D+02	-1.2258D+02
1.1389D+03	-5.0210D+02	1.4540D+03	1.0650D+03	-2.3702D+02	9.4764D+02
-3.7035D+02	-2.7422D+03	-9.8741D+02	1.7076D+03	-7.0445D+02	2.5773D+03
1.0637D+03	1.6243D+03	-1.4563D+03	2.9763D+03	-2.5373D+03	3.6355D+03
6.6368D+02	1.4781D+03	7.9103D+02	-1.1014D+03	-9.1809D+02	-2.7060D+01
2.6001D+02	-5.4315D+02	9.7492D+02	-2.0267D+02	-3.3561D+02	6.1359D+02
6.8542D+02	-1.4845D+03	-8.6167D+02	-3.4604D+03	-5.0799D+03	2.4557D+01
7.8092D+01	1.7138D+03	-2.6823D+03	-3.6302D+01	7.5293D+00	-7.4220D+02
3.8654D+03	1.2077D+03	3.6579D+02	7.1658D+02	-8.1535D+02	-3.8255D+02
2.0281D+03	-9.6040D+02	1.2504D+03	-8.2775D+02	7.8990D+00	6.9627D+02
3.5849D+03	-2.0277D+03	-2.0367D+03	1.7118D+03	-6.9800D+02	-2.5698D+03
2.2281D+03	5.7265D+02	-2.1197D+03	-2.9932D+03	2.5848D+03	3.6148D+03
1.0287D+03	-1.0244D+03	-1.2249D+03	1.3517D+03	2.9449D+02	-4.8493D+01
4.8036D+02	1.5334D+03	3.8200D+02	-1.3115D+03	-3.1491D+02	3.3455D+01
1.1856D+03	1.5744D+03	-2.7800D+02	1.3546D+03	-1.9794D+02	-2.4503D+02
1.1204D+03	-1.0881D+03	1.1634D+03	-1.2997D+03	2.0046D+02	2.7074D+02
4.3332D+02	-5.4735D+02	1.4870D+03	1.3674D+03	-1.3230D+02	2.8045D+02
1.1977D+03	-4.4257D+02	-1.4998D+03	-1.3269D+03	1.3677D+02	-2.9701D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
8.9654D-03	-1.8430D-02	-1.5344D-02	-6.5441D-03	7.6758D-03	1.6761D-03
-2.6222D-02	9.3927D-03	-2.7173D-02	-1.9378D-02	3.2433D-03	-1.2958D-02
8.5272D-03	5.1297D-02	1.8453D-02	-3.1068D-02	9.6395D-03	-3.5242D-02
-2.4490D-02	-3.0385D-02	2.7215D-02	-5.4152D-02	3.4720D-02	-4.9711D-02
-1.5281D-02	-2.7650D-02	-1.4783D-02	2.0039D-02	1.2563D-02	3.7002D-04
-5.9866D-03	1.0160D-02	-1.8219D-02	3.6875D-03	4.5924D-03	-8.3902D-03
-1.5782D-02	2.7771D-02	1.6103D-02	6.2960D-02	6.9512D-02	-3.3579D-04
-1.7980D-03	-3.2060D-02	5.0128D-02	6.6049D-04	-1.0303D-04	1.0149D-02
-8.9000D-02	-2.2593D-02	-6.8360D-03	-1.3038D-02	1.1157D-02	5.2309D-03
-4.6695D-02	1.7966D-02	-2.3368D-02	1.5060D-02	-1.0809D-04	-9.5206D-03
-8.2540D-02	3.7932D-02	3.8062D-02	-3.1145D-02	9.5513D-03	3.5138D-02
-5.1300D-02	-1.0712D-02	3.9612D-02	5.4459D-02	-3.5370D-02	-4.9428D-02
-2.3684D-02	1.9162D-02	2.2892D-02	-2.4593D-02	-4.0298D-03	6.6309D-04
-1.1060D-02	-2.8685D-02	-7.1388D-03	2.3862D-02	4.3091D-03	-4.5746D-04
-2.7298D-02	-2.9452D-02	5.1952D-03	-2.4647D-02	2.7086D-03	3.3504D-03
-2.5797D-02	2.0354D-02	-2.1741D-02	2.3648D-02	-2.7431D-03	-3.7020D-03
-9.9770D-03	1.0239D-02	-2.7789D-02	-2.4880D-02	1.8103D-03	-3.8348D-03
-2.7576D-02	8.2791D-03	2.8028D-02	2.4142D-02	-1.8715D-03	4.0612D-03

Columns 61 thru 66

-1.0572D-02	1.4868D-02	4.1256D-03	-1.0977D-02	3.7462D-03	1.0633D-02
-6.5884D-03	3.7215D-03	-1.4441D-02	1.8753D-02	-1.2440D-02	-1.3783D-02
8.7184D-03	-3.8334D-03	2.3715D-02	-2.4839D-02	1.6968D-02	1.5373D-02
-1.3433D-02	2.0586D-02	8.0280D-03	-1.4541D-02	1.2537D-03	1.5373D-02
-4.9425D-04	-1.2971D-02	-3.9109D-03	-1.6522D-02	9.4950D-03	-1.4743D-03
2.0258D-02	-8.0133D-03	3.2920D-02	8.7363D-05	4.0632D-04	8.2535D-04
-2.7153D-02	8.4077D-03	-3.4906D-02	-1.6043D-05	-1.7555D-03	-1.4364D-02
-2.9885D-04	-2.2262D-02	-6.2411D-03	-1.7232D-02	1.5435D-02	-1.8789D-03
1.0829D-02	1.4563D-02	4.0212D-03	-1.0860D-02	1.3911D-03	-1.1166D-02
-5.7930D-03	3.6323D-03	-1.5047D-02	-1.8565D-02	9.5946D-03	-1.6481D-02
7.2998D-03	-8.0056D-03	2.3289D-02	2.4653D-02	-1.3893D-02	1.9070D-02
1.4030D-02	2.1375D-02	3.4199D-03	-1.4309D-02	-2.0132D-03	-1.5252D-02
-1.6813D-02	-3.0078D-02	1.8356D-03	8.2684D-03	2.3270D-03	4.5845D-03
-1.0100D-02	-1.3805D-02	1.6327D-02	-1.4404D-02	-5.3749D-03	-6.3206D-03
1.3292D-02	1.2580D-02	-2.4724D-02	1.5307D-02	1.3881D-02	6.7132D-03
-2.2873D-02	-3.3209D-02	-2.1909D-03	8.6248D-03	-5.4785D-03	1.3947D-02
-4.6267D-04	1.4810D-02	3.6115D-03	2.1748D-02	2.1289D-02	-2.0015D-03
1.1792D-02	4.2772D-03	-1.5039D-02	5.3809D-05	5.4000D-04	3.8670D-03
-1.5213D-02	-5.6476D-03	2.0015D-02	5.2844D-05	-1.1835D-03	-9.4535D-03
-8.8283D-04	2.4832D-02	6.1615D-03	2.8774D-02	2.5922D-02	-2.3734D-03

1.7740D-02	-2.6076D-02	-1.5972D-02	8.4968D-03	9.3712D-04	-4.4175D-03
-9.1351D-03	3.7754D-03	1.9910D-02	1.4401D-02	3.4326D-03	-7.5371D-03
1.2522D-02	1.2719D-03	-2.6697D-02	-1.5287D-02	-1.1926D-02	9.4681D-03
2.3735D-02	-3.0726D-02	-1.3889D-02	8.9955D-03	-8.4691D-03	-1.1947D-02
-6.8050D-05	-5.7149D-04	6.3454D-05	-7.5718D-05	-4.6498D-03	5.6462D-04
-1.7759D-04	3.6222D-05	5.5335D-04	1.8062D-02	4.4586D-04	4.8995D-03
-4.5214D-04	4.5007D-04	7.7588D-03	1.5192D-03	-6.2921D-03	-1.2679D-02
-4.1758D-04	6.6403D-03	3.7449D-03	-3.1326D-03	-1.5512D-02	-1.8582D-03
-8.9513D-05	1.0416D-05	3.2628D-07	3.0859D-02	-1.5158D-04	3.3021D-04
-3.7274D-05	5.5026D-03	1.2180D-03	-1.0361D-04	4.8845D-03	-5.3932D-04
-4.1357D-05	1.4840D-03	-5.1035D-03	3.0673D-04	-1.1287D-04	-4.5811D-03
3.7010D-04	-5.3209D-03	1.9485D-02	-2.1987D-04	1.4145D-03	1.6258D-02
2.2233D-04	1.9592D-02	5.2234D-03	3.9179D-06	1.6434D-02	-1.6726D-03
5.1808D-05	4.8065D-03	8.7245D-04	7.2557D-04	4.1361D-03	-7.0129D-04
5.1336D-05	1.2454D-03	-4.1772D-03	-1.0154D-03	-9.8940D-05	-3.5154D-03
-1.1993D-04	4.4827D-03	1.3687D-03	6.0246D-04	3.9512D-03	6.1896D-07
3.1268D-05	6.5607D-04	-4.5529D-03	1.1099D-03	-7.7672D-04	-3.7024D-03
7.9367D-06	4.2808D-03	8.7503D-04	-1.1683D-03	3.3561D-03	-4.9498D-04
-1.4249D-04	1.2313D-03	-4.7814D-03	-3.1485D-05	-2.8362D-04	-4.2108D-03
7.6168D+01	-2.2308D+03	-7.0301D+02	5.6408D+01	-2.8266D+03	-1.1347D+03
4.0628D+02	-7.1038D+02	2.2123D+03	1.4271D+02	1.1688D+03	1.0557D+03
-3.9262D+03	2.0024D+03	2.5300D+03	2.5233D+02	3.3615D+03	2.4952D+03
2.2432D+03	-1.7389D+03	-9.0394D+02	4.2911D+02	-2.7039D+03	5.0370D+02
-3.2509D+02	-2.2340D+03	-7.1851D+02	-1.7566D+02	-4.7311D+02	-1.6358D+02
-6.7172D+01	-6.8556D+02	2.2225D+03	-4.2220D+01	1.8957D+02	3.3794D+03
7.9421D+01	-6.4074D+02	-2.1382D+02	-4.7021D+02	-1.8347D+03	2.6524D+02
-4.5742D+03	8.6213D+02	-3.5217D+03	3.1132D+01	-4.4197D+02	-4.6492D+03
2.9264D+02	-2.2052D+03	-7.0830D+02	6.7910D+01	-2.5220D+03	1.3597D+03
-1.8613D+02	-7.0877D+02	2.2366D+03	-1.4071D+02	-1.3143D+03	1.3515D+03
3.8298D+03	3.0359D+03	-1.2657D+03	3.1478D+02	2.7581D+03	-3.0488D+03
2.3243D+03	1.9330D+03	8.9566D+01	-4.4479D+02	2.8665D+03	-1.1469D+02
6.5577D+01	-5.7084D+02	1.3500D+02	-1.3117D+03	-6.6671D+02	-6.2160D+02
-1.7701D+01	4.2444D+02	4.0820D+02	1.3320D+03	5.2771D+02	-6.9968D+02
5.9654D+01	4.1126D+02	4.2710D+02	-1.3391D+03	-1.8224D+02	8.8621D+02
-2.2363D+01	1.5332D+02	-5.7615D+02	1.3328D+03	-8.9432D+02	-1.0231D+02
5.5808D+01	1.5176D+02	-5.7312D+02	-1.3356D+03	8.8462D+02	-2.9703D+02
-2.2316D+01	-5.7079D+02	1.6969D+02	1.3241D+03	3.2869D+02	8.4824D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-9.6199D-04	2.7496D-02	8.6611D-03	-6.0322D-04	2.9274D-02	1.1746D-02
-5.1312D-03	8.7557D-03	-2.7255D-02	-1.5262D-03	-1.2105D-02	-1.0929D-02
4.9587D-02	-2.4680D-02	-3.1170D-02	-2.6984D-03	-3.4815D-02	-2.5830D-02
-2.8331D-02	2.1432D-02	1.1137D-02	-4.5889D-03	2.8004D-02	-5.2141D-03
4.1058D-03	2.7535D-02	8.8520D-03	1.8786D-03	4.8999D-03	1.6933D-03
8.4838D-04	8.4498D-03	-2.7381D-02	4.5151D-04	-1.9633D-03	-3.4982D-02
-1.0031D-03	7.8973D-03	2.6342D-03	5.0285D-03	1.9001D-02	-2.7457D-03
5.7772D-02	-1.0626D-02	4.3388D-02	-3.3293D-04	4.5774D-03	4.8127D-02
-3.6960D-03	2.7179D-02	8.7263D-03	-7.2623D-04	2.6120D-02	-1.4075D-02
2.3508D-03	8.7358D-03	-2.7555D-02	1.5048D-03	1.3612D-02	-1.3990D-02
-4.8370D-02	-3.7418D-02	1.5593D-02	-3.3662D-03	-2.8565D-02	3.1560D-02
-2.9355D-02	-2.3825D-02	-1.1034D-03	4.7566D-03	-2.9688D-02	1.1872D-03
-8.2823D-04	7.0358D-03	-1.6632D-03	1.4028D-02	6.9050D-03	6.4346D-03
2.2356D-04	-5.2314D-03	-5.0290D-03	-1.4244D-02	-5.4654D-03	7.2429D-03
-7.5342D-04	-5.0689D-03	-5.2619D-03	1.4321D-02	1.8874D-03	-9.1738D-03
2.8244D-04	-1.8897D-03	7.0982D-03	-1.4253D-02	9.2623D-03	1.0590D-03
-7.0485D-04	-1.8705D-03	7.0608D-03	1.4283D-02	-9.1619D-03	3.0747D-03
2.8185D-04	7.0352D-03	-2.0906D-03	-1.4160D-02	-3.4041D-03	-8.7808D-03

Columns 67 thru 72

-6.3140D-03	-1.1341D-03	-1.3580D-02	-1.4162D-02	8.1336D-03	8.1101D-03
1.0572D-02	1.6119D-03	-4.7123D-03	-1.0366D-02	5.9790D-04	7.9432D-03
-1.8927D-02	-1.3423D-02	5.9603D-04	-2.3275D-03	9.7071D-03	-1.7193D-02
-1.0999D-02	-8.0740D-03	1.2317D-03	9.4917D-04	1.6960D-02	5.8034D-03
-1.9957D-03	1.4859D-02	-2.3064D-03	-2.1058D-02	-1.5105D-02	-6.4263D-03
2.8534D-04	1.0175D-03	1.8393D-02	-2.4374D-03	-1.6669D-03	4.6388D-03
-2.5253D-04	-1.0344D-03	-8.3105D-03	1.0090D-03	3.7578D-03	-7.3447D-03
-6.7222D-03	1.3981D-03	-1.1264D-03	-8.0367D-03	4.1814D-03	2.0334D-03
-6.0821D-03	-5.6098D-04	8.4606D-03	-1.7375D-02	1.2066D-02	1.7623D-03
-1.0771D-02	-1.9639D-03	-1.4988D-03	1.1651D-02	-6.0297D-03	4.1646D-03
1.9201D-02	1.3797D-02	1.0810D-03	1.1009D-03	6.4763D-03	-1.8716D-02
-1.0847D-02	-7.4470D-03	-2.1520D-03	1.4447D-03	1.5666D-02	8.8205D-03
9.3313D-04	-8.2945D-03	1.8446D-02	6.6194D-03	-4.1448D-03	7.6747D-03
-1.7266D-03	1.2216D-02	-9.1299D-03	1.8572D-02	1.2732D-02	-7.4064D-03
5.9820D-03	-7.7212D-04	3.2821D-03	-7.9081D-03	1.1345D-03	-5.2984D-03
3.3380D-03	-1.5587D-03	7.7390D-03	3.4683D-03	5.7104D-03	4.2656D-03
1.2345D-02	1.8557D-03	1.5190D-04	3.0890D-03	4.1087D-03	1.5427D-03
5.7934D-05	2.4727D-04	-2.2204D-02	3.4023D-03	-6.1485D-03	1.1668D-02
-1.4726D-04	-3.6763D-04	-2.0975D-03	-1.7423D-04	6.9861D-03	-1.5445D-02
2.1974D-02	1.5644D-02	-1.1439D-03	-1.8226D-03	1.8787D-02	8.3768D-03
1.1039D-03	-6.6829D-03	-1.5905D-02	1.0622D-02	2.3125D-03	-8.6366D-03
1.4651D-03	-1.3276D-02	-1.3063D-02	-1.6206D-02	-3.7578D-03	-1.4197D-02
-5.7018D-03	1.7782D-03	4.9692D-03	6.7747D-03	3.6270D-03	-3.8849D-03
3.5979D-03	1.0831D-04	-6.8518D-03	5.1778D-03	6.7736D-03	2.0767D-03
1.3463D-04	1.6575D-05	-4.9819D-04	-2.4742D-03	4.9614D-03	2.3301D-03
-4.2546D-02	1.0721D-02	-2.3539D-03	6.0686D-04	-2.2672D-03	4.8816D-03
-3.9544D-03	1.0982D-03	-6.5361D-03	-4.6520D-03	2.2032D-03	2.2006D-03

8.9513D-03	-2.2948D-03	5.6025D-03	4.9290D-03	2.2962D-03	-9.2615D-04
-7.2531D-02	1.8280D-02	3.0624D-04	1.9758D-04	1.4001D-04	-6.4879D-05
-6.7393D-04	-2.5343D-03	4.6127D-04	5.5160D-03	4.4731D-03	1.6206D-03
1.1291D-03	3.9904D-03	5.0734D-03	-2.5038D-05	-1.3367D-03	4.2724D-03
-4.0633D-04	-1.3488D-03	-7.7852D-03	1.2948D-03	-3.5434D-03	7.7641D-03
-3.3606D-04	-1.2219D-03	1.3653D-03	7.5419D-03	-7.9470D-03	-4.0565D-03
2.7163D-03	9.5756D-03	3.2465D-04	4.8535D-03	4.7255D-03	9.3988D-04
-4.1457D-03	-1.4747D-02	4.0453D-03	-8.0218D-04	-3.1869D-03	3.3852D-03
2.2342D-03	7.8465D-03	2.7927D-04	4.0786D-03	2.6482D-03	2.0409D-03
4.4332D-03	1.5784D-02	4.7136D-03	-7.7167D-04	-2.1778D-03	5.4512D-03
-4.9383D-03	-1.7707D-02	1.0264D-03	4.3603D-03	4.7396D-03	3.4094D-03
-2.6441D-04	-1.0081D-03	4.4104D-03	-1.2428D-04	-8.6511D-04	3.4471D-03
-9.6000D+02	-4.0525D+03	3.6442D+02	-4.0710D+03	3.3645D+02	-4.5791D+03
-1.4917D+03	-6.3637D+03	-2.5693D+03	7.6322D+02	-1.2064D+03	-7.0944D+03
1.2405D+03	4.6721D+03	-8.7003D+02	4.3034D+03	-2.2761D+02	6.4080D+03
2.1003D+03	7.8282D+03	2.0709D+03	-1.1807D+03	1.5788D+03	1.0722D+04
1.7401D+03	7.5449D+03	9.2161D+01	-2.5171D+03	-7.7428D+03	-3.4505D+03
-1.0218D+02	-3.6018D+02	-4.1754D+03	5.8836D+02	-7.8788D+01	8.0130D+02
-2.3932D+03	-9.1236D+03	-1.9849D+02	1.8755D+03	1.1472D+04	5.1708D+03
4.4200D+01	1.6709D+02	4.6214D+03	-6.3730D+02	3.3405D+02	-7.2133D+02
-8.1471D+02	-3.4352D+03	-1.1622D+03	-3.4937D+03	-2.7739D+03	3.0013D+03
1.5705D+03	6.6937D+03	-3.2129D+03	-5.6976D+02	6.2754D+03	-4.0651D+03
1.2127D+03	4.3847D+03	1.6896D+03	3.6097D+03	4.6153D+03	-4.3764D+03
-2.1322D+03	-7.9594D+03	2.8618D+03	1.0862D+03	-9.0733D+03	5.9975D+03
-6.2472D+02	1.8283D+02	-2.4377D+03	1.3462D+03	-5.2672D+02	8.3440D+00
6.2455D+02	-1.6324D+02	-2.7636D+03	-6.0479D+02	1.3070D+02	4.4639D+02
-6.1191D+02	1.8823D+02	2.3815D+03	1.4694D+03	2.2241D+02	-4.6472D+02
6.4542D+02	-1.7076D+02	8.6404D+02	2.6907D+03	-5.0968D+02	-1.1626D+02
-6.3774D+02	2.0389D+02	7.7938D+01	-2.7966D+03	3.3055D+02	4.3915D+02
6.4304D+02	-1.4331D+02	1.8922D+03	-2.0857D+03	3.5478D+02	-3.4472D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
8.4941D-03	3.4102D-02	-2.9718D-03	3.3154D-02	-2.5177D-03	3.4265D-02
1.3198D-02	5.3551D-02	2.0953D-02	-6.2157D-03	9.0276D-03	5.3087D-02
-1.0976D-02	-3.9316D-02	7.0951D-03	-3.5047D-02	1.7032D-03	-4.7950D-02

-1.8584D-02	-6.5875D-02	-1.6889D-02	9.6154D-03	-1.1815D-02	-8.0232D-02
-1.5396D-02	-6.3491D-02	-7.5158D-04	2.0500D-02	5.7940D-02	2.5820D-02
9.0408D-04	3.0309D-03	3.4050D-02	-4.7917D-03	5.8958D-04	-5.9961D-03
2.1175D-02	7.6776D-02	1.6187D-03	-1.5274D-02	-8.5843D-02	-3.8693D-02
-3.9108D-04	-1.4061D-03	-3.7688D-02	5.1902D-03	-2.4997D-03	5.3977D-03
7.2086D-03	2.8908D-02	9.4775D-03	2.8453D-02	2.0757D-02	-2.2458D-02
-1.3896D-02	-5.6328D-02	2.6202D-02	4.6401D-03	-4.6959D-02	3.0419D-02
-1.0730D-02	-3.6897D-02	-1.3779D-02	-2.9397D-02	-3.4537D-02	3.2748D-02
1.8866D-02	6.6979D-02	-2.3338D-02	-8.8461D-03	6.7896D-02	-4.4878D-02
5.5275D-03	-1.5385D-03	1.9879D-02	-1.0963D-02	3.9415D-03	-6.2438D-05
-5.5260D-03	1.3737D-03	2.2537D-02	4.9255D-03	-9.7805D-04	-3.3403D-03
5.4142D-03	-1.5840D-03	-1.9421D-02	-1.1967D-02	-1.6643D-03	3.4775D-03
-5.7107D-03	1.4370D-03	-7.0463D-03	-2.1913D-02	3.8140D-03	8.6997D-04
5.6427D-03	-1.7158D-03	-6.3558D-04	2.2776D-02	-2.4735D-03	-3.2861D-03
-5.6897D-03	1.2060D-03	-1.5431D-02	1.6986D-02	-2.6548D-03	2.5795D-03

Columns 73 thru 78

1.9462D-03	-1.6113D-03	1.4795D-02	6.6087D-03	-4.0865D-03	6.3136D-03
1.3820D-03	3.4795D-03	8.2853D-03	-5.0312D-03	-7.0087D-03	-9.7599D-03
-2.2060D-03	-6.5581D-03	-6.7245D-03	1.2998D-02	1.4439D-02	6.8729D-03
1.6276D-03	-3.5008D-03	1.2070D-02	1.4253D-02	-5.6929D-03	-3.9481D-04
3.5245D-04	-2.4616D-03	-4.7948D-05	6.2541D-03	-3.9433D-03	-8.4015D-04
-2.6827D-02	4.4530D-04	7.7598D-03	-1.1614D-03	-2.1096D-03	-1.7837D-02
1.8126D-02	-2.2848D-04	-3.9091D-03	2.3862D-03	4.2705D-03	2.9749D-02
-2.3034D-04	-5.3619D-03	-3.1143D-04	7.8799D-03	-4.9863D-03	2.7386D-04
-1.9734D-03	-2.0732D-03	-1.5139D-02	6.1269D-03	-4.0960D-03	-5.7343D-03
1.1102D-03	-3.0498D-03	8.2583D-03	-4.1326D-03	-7.7285D-03	-7.0672D-03
-9.5247D-04	5.9246D-03	-6.3249D-03	7.4071D-03	1.8165D-02	7.9074D-03
-2.2358D-03	-3.7195D-03	-1.2991D-02	1.0949D-02	-1.0523D-02	4.9142D-03
2.3375D-02	8.3196D-04	-7.0052D-03	4.2064D-03	6.8218D-04	-6.7783D-03
1.3551D-02	-2.2028D-03	-4.1338D-03	-5.2791D-03	-3.5718D-03	5.3338D-04
-9.0615D-03	4.6689D-03	2.5898D-03	6.1370D-03	5.6200D-03	5.8592D-03
1.6092D-02	2.4320D-03	-3.7704D-03	5.9580D-03	-8.2551D-04	-7.5205D-03
1.8855D-04	3.6409D-03	-2.8681D-04	7.0618D-03	-4.5199D-03	2.5816D-03
-1.6736D-03	-4.8095D-05	-1.7518D-02	-3.7570D-03	-5.5547D-03	2.0153D-03
1.8434D-03	4.7783D-05	1.4946D-02	7.0037D-03	1.0707D-02	1.1987D-02
7.7936D-04	7.0147D-03	-1.7129D-04	1.7313D-02	-1.0882D-02	1.4234D-03
-2.3564D-02	1.7461D-03	6.6101D-03	1.2597D-03	-4.0332D-03	1.2147D-02
1.3099D-02	1.9277D-03	-4.2161D-03	-1.1459D-03	-6.0956D-03	-3.2685D-03
-9.6463D-03	-4.7237D-03	2.2542D-03	2.3905D-03	8.0775D-03	1.0933D-02
-1.5639D-02	2.8769D-03	3.3654D-03	3.4026D-03	-4.6160D-03	1.7095D-02
-2.9030D-05	2.9954D-05	1.4537D-05	5.6023D-03	-3.6246D-03	7.4438D-04
2.3547D-04	1.1324D-03	-2.6869D-04	-3.5467D-03	-5.7205D-03	-3.5614D-03
-1.8328D-03	2.0083D-04	5.9010D-03	5.1755D-03	-9.5069D-04	1.7816D-02
-1.2053D-03	-4.4077D-04	4.4701D-03	6.6678D-03	-9.1369D-04	9.5345D-03
1.8636D-04	1.7566D-03	-2.3998D-04	7.5931D-05	-2.9636D-05	-1.2461D-04
-1.3869D-05	7.3653D-04	9.9162D-05	-3.1394D-03	1.8960D-03	-1.1019D-05
6.4860D-05	-1.2204D-03	1.3342D-05	1.4281D-03	2.9515D-03	2.1206D-04
1.3169D-04	4.8901D-04	-1.4443D-04	-1.9553D-03	-2.9465D-03	-5.5191D-03
2.6221D-04	3.4354D-04	3.2184D-04	-2.8172D-03	1.8234D-03	-1.0812D-03
-5.1743D-06	-2.8658D-03	-2.0349D-04	-2.7948D-03	1.3605D-03	-8.5896D-05

8.6467D-05	4.2604D-03	3.8369D-04	1.9217D-03	1.9510D-03	3.2577D-04
-9.6435D-06	-2.2594D-03	-1.1610D-04	-1.8929D-03	1.3326D-03	-2.2993D-04
1.1039D-04	-4.6634D-03	-2.5675D-04	1.9617D-03	2.6653D-03	-1.8137D-04
1.8536D-05	5.1547D-03	4.3785D-04	-2.2873D-03	2.2701D-03	-9.6819D-05
2.3394D-05	3.2241D-04	1.2548D-04	1.1541D-03	2.3385D-03	2.3703D-04
3.3039D+03	1.7926D+03	2.8226D+03	2.6635D+03	-2.3530D+03	1.0293D+03
-1.9435D+03	2.9371D+03	-1.4405D+03	-1.5646D+03	-3.3441D+03	8.1185D+02
-4.0146D+03	-1.7513D+03	-2.9843D+03	-2.0969D+03	2.2775D+03	-6.3591D+02
2.6703D+03	-2.9213D+03	1.6566D+03	1.2698D+03	3.2752D+03	-1.3408D+03
-1.1459D+02	-3.4429D+03	-3.1990D+02	3.6320D+03	-2.1503D+03	-3.5340D+02
3.9071D+03	1.3759D+02	3.0800D+03	-1.8305D+03	-2.6309D+03	-5.8902D+02
-8.0489D+01	3.4283D+03	2.0402D+02	-3.5509D+03	2.1342D+03	4.1878D+02
-4.8753D+03	-8.9375D+01	-3.3412D+03	1.4563D+03	2.1020D+03	-2.7763D+02
-3.1812D+03	1.6721D+03	-2.6203D+03	2.9960D+03	-1.3209D+03	-6.4819D+02
-2.1411D+03	-2.9727D+03	-1.9330D+03	-2.5565D+03	-3.2161D+03	9.7003D+02
4.0889D+03	-1.7016D+03	2.8698D+03	-2.7438D+03	8.4969D+02	5.9692D+02
2.5124D+03	2.9378D+03	1.9459D+03	2.6388D+03	2.8552D+03	-1.4042D+03
3.4759D+02	1.4585D+03	-2.8809D+03	4.8484D+02	-1.1396D+03	-2.3919D+02
2.6761D+02	-1.4904D+03	-2.9595D+03	-1.3202D+03	-3.1465D+01	1.2292D+03
2.9509D+02	1.3880D+03	-2.8622D+03	-1.2460D+03	4.4515D+02	3.4986D+03
2.1602D+02	-1.4998D+03	-2.8601D+03	5.4854D+02	1.2382D+03	-3.7773D+03
3.2407D+02	1.3791D+03	-2.8608D+03	8.7901D+02	1.0674D+03	-3.1689D+03
2.1466D+02	-1.4931D+03	-2.9011D+03	7.8974D+02	-9.4670D+02	2.4926D+03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-2.3487D-02	-1.1315D-02	-1.6746D-02	-1.5436D-02	1.3631D-02	-5.4971D-03
1.3816D-02	-1.8539D-02	8.5462D-03	9.0678D-03	1.9373D-02	-4.3360D-03
2.8539D-02	1.1054D-02	1.7705D-02	1.2153D-02	-1.3194D-02	3.3963D-03
-1.8983D-02	1.8439D-02	-9.8281D-03	-7.3592D-03	-1.8974D-02	7.1612D-03
8.1461D-04	2.1732D-02	1.8978D-03	-2.1050D-02	1.2457D-02	1.8874D-03
-2.7775D-02	-8.6847D-04	-1.8273D-02	1.0609D-02	1.5241D-02	3.1458D-03
5.7219D-04	-2.1639D-02	-1.2104D-03	2.0579D-02	-1.2364D-02	-2.2367D-03
3.4658D-02	5.6414D-04	1.9822D-02	-8.4401D-03	-1.2177D-02	1.4828D-03
2.2615D-02	-1.0554D-02	1.5546D-02	-1.7363D-02	7.6521D-03	3.4619D-03
1.5221D-02	1.8763D-02	1.1468D-02	1.4817D-02	1.8631D-02	-5.1808D-03

-2.9067D-02	1.0741D-02	-1.7026D-02	1.5902D-02	-4.9225D-03	-3.1881D-03
-1.7861D-02	-1.8543D-02	-1.1544D-02	-1.5294D-02	-1.6541D-02	7.4997D-03
-2.4710D-03	-9.2062D-03	1.7091D-02	-2.8099D-03	6.6018D-03	1.2775D-03
-1.9024D-03	9.4071D-03	1.7558D-02	7.6515D-03	1.8228D-04	-6.5650D-03
-2.0978D-03	-8.7612D-03	1.6980D-02	7.2213D-03	-2.5789D-03	-1.8686D-02
-1.5357D-03	9.4670D-03	1.6968D-02	-3.1791D-03	-7.1730D-03	2.0174D-02
-2.3038D-03	-8.7047D-03	1.6972D-02	-5.0944D-03	-6.1840D-03	1.6924D-02
-1.5260D-03	9.4242D-03	1.7211D-02	-4.5770D-03	5.4845D-03	-1.3313D-02

Columns 79 thru 80

-3.9155D-04	2.0109D-05
4.2419D-03	1.2150D-03
4.2788D-03	7.4130D-03
-1.1359D-02	4.6696D-03
4.0436D-03	5.6754D-03
-3.7914D-03	-4.6700D-04
6.1728D-03	3.2206D-04
-1.4144D-03	8.5685D-03
-2.7800D-03	-1.0465D-03
-7.8358D-03	-9.7259D-04
-1.2213D-03	-7.3252D-03
-1.0072D-02	4.2075D-03
-1.4517D-02	-2.9042D-03
-9.6698D-03	5.2743D-03
1.3923D-02	-7.3336D-03
-2.5350D-02	-4.7837D-03
-1.2121D-02	1.2188D-03
5.4485D-04	-3.0102D-04
2.4000D-03	3.0552D-04
-6.0552D-03	-9.0980D-03
-1.0611D-02	-3.0754D-03
9.2025D-03	-5.2097D-03
-1.0561D-02	7.7162D-03
-2.0198D-02	-4.2212D-03
-3.5847D-03	5.1983D-05
-6.8296D-04	3.8128D-03
-5.3965D-03	9.2879D-04
-1.9186D-02	-1.4466D-03
5.1929D-05	6.5362D-03
3.6705D-04	-3.2576D-03
9.6767D-05	5.3302D-03
-1.2425D-03	-2.4203D-03
5.7396D-03	-1.9854D-03
2.2134D-04	1.2676D-02
1.3601D-04	-1.8485D-02
3.8650D-04	9.6513D-03
1.6150D-04	2.0313D-02
-1.4114D-05	-2.2317D-02
-1.9376D-05	-1.7070D-03
-4.3813D+01	-1.0247D+04
9.2585D+02	-1.6208D+04

-6.5237D+02	9.7008D+03
-8.0687D+02	1.5213D+04
1.3324D+03	1.8701D+04
-2.2936D+02	-8.0890D+02
-1.6761D+03	-1.7559D+04
4.0297D+01	8.1970D+02
-4.1338D+02	-8.8205D+03
-5.5666D+02	1.6748D+04
-3.8425D+02	8.2189D+03
2.3187D+02	-1.5786D+04
3.8556D+03	-3.2199D+03
-3.5690D+03	3.1519D+03
-1.6612D+03	-3.1706D+03
7.6168D+02	2.9716D+03
-2.1587D+03	-3.1722D+03
2.9535D+03	3.0671D+03
0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00
2.3332D-04	4.9903D-02
-4.9305D-03	7.8937D-02
3.4741D-03	-4.7245D-02
4.2969D-03	-7.4093D-02
-7.0954D-03	-9.1078D-02
1.2215D-03	3.9395D-03
8.9261D-03	8.5515D-02
-2.1460D-04	-3.9921D-03
2.2014D-03	4.2958D-02
2.9644D-03	-8.1565D-02
2.0463D-03	-4.0028D-02
-1.2348D-03	7.6883D-02
-2.0532D-02	1.5681D-02
1.9006D-02	-1.5350D-02
8.8463D-03	1.5441D-02
-4.0562D-03	-1.4473D-02

1.1496D-02	1.5449D-02
-1.5728D-02	-1.4937D-02

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Columns 1 thru 6

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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1.0208D-01	3.2272D-03	-2.5140D-02	-2.4502D-05	-2.5279D-03	-1.5255D-03
3.2272D-03	1.0852D-01	6.8832D-04	-2.5424D-02	6.3886D-03	-4.3489D-03
-2.5140D-02	6.8832D-04	1.0831D-01	4.5534D-03	1.6767D-03	3.3114D-03
-2.4502D-05	-2.5424D-02	4.5534D-03	1.0961D-01	-4.1541D-03	6.0387D-04
-2.5279D-03	6.3886D-03	1.6767D-03	-4.1541D-03	1.0980D-01	1.2730D-03
-1.5255D-03	-4.3489D-03	3.3114D-03	6.0387D-04	1.2730D-03	.0106D-01

6.2071D-04	-3.3733D-03	-4.2172D-04	8.9298D-04	-2.5121D-02	-1.1019D-05
3.5218D-03	6.2298D-04	-6.0411D-03	2.5587D-03	-7.6479D-04	-2.5658D-02
-5.9528D-03	-4.3896D-03	4.9007D-04	3.4048D-03	-1.7556D-03	2.0372D-03
3.5682D-03	-9.2605D-04	-3.5343D-03	7.3856D-04	-5.9161D-03	-5.0055D-03
1.1570D-03	4.4123D-03	4.1487D-03	-3.4652D-03	6.5376D-04	-3.5811D-03
-3.1101D-03	1.1064D-03	3.5456D-03	-1.9754D-03	3.3512D-03	4.9288D-04
1.8049D-03	-1.2854D-03	-9.6510D-04	1.0050D-03	7.0689D-04	1.3013D-03
-4.9106D-03	-2.7144D-04	3.9281D-03	-8.7234D-04	-6.4655D-04	1.4260D-03
-2.8617D-03	5.0702D-03	3.3161D-03	-4.0701D-03	1.6266D-04	2.1827D-03
1.3816D-03	-7.8545D-04	-2.6908D-04	3.5895D-04	2.7120D-03	-4.1272D-03
7.8532D-04	-1.2594D-03	-2.1060D-03	7.9506D-04	-2.9272D-03	-5.0748D-03
1.5336D-03	-1.4323D-04	-1.8258D-03	1.5843D-03	-4.6474D-05	1.6186D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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6.2071D-04	3.5218D-03	-5.9528D-03	3.5682D-03	1.1570D-03	-3.1101D-03
-3.3733D-03	6.2298D-04	-4.3896D-03	-9.2605D-04	4.4123D-03	1.1064D-03
-4.2172D-04	-6.0411D-03	4.9007D-04	-3.5343D-03	4.1487D-03	3.5456D-03
8.9298D-04	2.5587D-03	3.4048D-03	7.3856D-04	-3.4652D-03	-1.9754D-03
-2.5121D-02	-7.6479D-04	-1.7556D-03	-5.9161D-03	6.5376D-04	3.3512D-03
-1.1019D-05	-2.5658D-02	2.0372D-03	-5.0055D-03	-3.5811D-03	4.9288D-04
1.1325D-01	-1.6231D-03	5.0141D-04	3.4210D-03	-4.2203D-04	-8.3178D-04
-1.6231D-03	1.0485D-01	-4.0886D-03	1.6615D-03	6.1576D-03	2.6451D-03
5.0141D-04	-4.0886D-03	1.0417D-01	-4.4158D-03	-2.5686D-02	-3.8889D-04
3.4210D-03	1.6615D-03	-4.4158D-03	1.0648D-01	3.2811D-04	-2.4922D-02
-4.2203D-04	6.1576D-03	-2.5686D-02	3.2811D-04	1.0536D-01	-2.8542D-03
-8.3178D-04	2.6451D-03	-3.8889D-04	-2.4922D-02	-2.8542D-03	1.1257D-01
3.5613D-04	-2.2057D-03	5.8524D-03	-2.2330D-05	-5.2304D-03	-8.4367D-04

-4.5497D-04	-2.4077D-03	-1.4102D-03	-8.5037D-04	4.9713D-04	7.9908D-05
-3.5365D-04	-1.2985D-03	-1.5299D-03	-5.9820D-05	1.6043D-03	1.4236D-03
-1.2199D-03	3.8460D-03	-8.3552D-04	-1.2362D-03	2.2108D-03	7.8847D-04
1.8534D-03	4.9843D-03	-2.0124D-03	-9.4227D-04	1.3426D-03	3.5864D-04
-1.5811D-04	-4.4602D-04	2.2163D-03	4.3881D-03	-2.7066D-03	-2.9773D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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1.8049D-03	-4.9106D-03	-2.8617D-03	1.3816D-03	7.8532D-04	1.5336D-03
-1.2854D-03	-2.7144D-04	5.0702D-03	-7.8545D-04	-1.2594D-03	-1.4323D-04
-9.6510D-04	3.9281D-03	3.3161D-03	-2.6908D-04	-2.1060D-03	-1.8258D-03
1.0050D-03	-8.7234D-04	-4.0701D-03	3.5895D-04	7.9506D-04	1.5843D-03
7.0689D-04	-6.4655D-04	1.6266D-04	2.7120D-03	-2.9272D-03	-4.6474D-05
1 3013D-03	1.4260D-03	2.1827D-03	-4.1272D-03	-5.0748D-03	1.6186D-03
3.5613D-04	-4.5497D-04	-3.5365D-04	-1.2199D-03	1.8534D-03	-1.5811D-04
-2.2057D-03	-2.4077D-03	-1.2985D-03	3.8460D-03	4.9843D-03	-4.4602D-04
5.8524D-03	-1.4102D-03	-1.5299D-03	-8.3552D-04	-2.0124D-03	2.2163D-03
-2.2330D-05	-8.5037D-04	-5.9820D-05	-1.2362D-03	-9.4227D-04	4.3881D-03
-5.2304D-03	4.9713D-04	1.8043D 03	2.2108D-03	1.3426D-03	-2.7066D-03
-8.4367D-04	7.9908D-05	1.4236D-03	7.8847D-04	3.5864D-04	-2.9773D-03
3.0321D-02	-1.9516D-02	-5.8998D-03	5.5899D-03	-5.9006D-03	3.1710D-03
-1.9516D-02	3.1022D-02	3.1722D-03	-6.1854D-03	5.6386D-03	-6.2237D-03
-5.8998D-03	3.1722D-03	3.0388D-02	-1.9500D-02	-5.8661D-03	5.5877D-03
5.5899D-03	-6.1854D-03	-1.9500D-02	3.0948D-02	3.1393D-03	-6.1842D-03
-5.9006D-03	5.6386D-03	-5.8661D-03	3.1393D-03	3.0371D-02	-1.9479D-02
3.1710D-03	-6.2237D-03	5.5877D-03	-6.1842D-03	-1.9479D-02	3.0973D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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$\mathbf{D}_{sn} =$

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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-9.0114D-04	-1.2057D-03	-1.3980D-03	-3.3757D-03	-2.0929D-03	-3.5029D-03
-8.2259D-04	-1.4203D-03	6.4951D-04	7.5811D-04	2.8860D-03	2.2042D-03
-7.1283D-04	1.5415D-03	-2.0539D-03	3.4960D-03	2.3385D-03	-1.1534D-03
2.6876D-04	-4.4435D-04	1.1227D-03	-1.0255D-03	-2.5474D-03	3.8258D-05
3.1548D-03	9.5488D-04	1.2723D-04	-1.4626D-03	-1.5323D-04	1.0274D-03
6.6390D-04	-4.6427D-04	-1.4226D-04	-3.2707D-03	-4.1295D-03	-3.2635D-03
-7.5299D-03	-8.9868D-04	3.0550D-04	1.0357D-03	5.4044D-04	-8.5750D-04
-1.0479D-03	-8.3776D-04	3.0413D-04	3.3107D-03	-1.0445D-03	3.4852D-03
-5.8795D-04	-1.1835D-03	-4.2172D-04	3.6758D-03	2.3245D-03	3.5844D-03
2.2708D-03	2.1780D-03	-1.5281D-04	1.9190D-03	2.5356D-03	3.8764D-04
-1.4870D-03	2.2090D-03	1.2078D-03	5.8989D-04	-2.6044D-03	-3.4218D-03
-3.1618D-03	-5.8216D-03	-3.0268D-04	9.8106D-04	-2.5003D-03	-7.8724D-04
-1.0099D-03	-1.1866D-03	4.9345D-04	-1.7777D-04	1.8634D-04	-8.0188D-04
1.0982D-03	-1.0013D-03	-1.9023D-03	-1.0607D-03	2.7665D-04	-1.0859D-04
1.2267D-03	-3.3817D-04	-1.9752D-03	1.9927D-04	-8.2038D-04	-1.8120D-04
6.8066D-04	1.4233D-03	4.2571D-04	2.6937D-04	-1.0531D-04	-1.0628D-03
-7.0263D-04	1.1584D-03	-8.5636D-05	-8.1518D-04	-1.8579D-04	1.8864D-04
-1.2902D-03	-2.5195D-07	-3.3331D-05	-1.0386D-04	-1.0635D-03	2.7416D-04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

12-State Modal Reduced Order Model

F, =

Columns 1 thru 6

-1.9457D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-2.2308D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-2.2309D-01	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-4.6360D-01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.6368D-01	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.7002D-01
1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	1.0000D+00

Columns 7 thru 12

-2.3661D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-3.1104D+03	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.1105D+03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.3433D+04	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3437D+04	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.3808D+04
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

B, =

Columns 1 thru 6

-1.3623D-02	-2.4230D-02	-4.3212D-02	-7.6436D-02	2.7714D-02	4.3360D-04
-2.5727D-02	4.2685D-03	-6.6964D-02	-2.5473D-03	-1.6914D-02	-3.3997D-03
-8.6415D-03	2.1044D-02	-9.9608D-03	6.6314D-02	-1.2267D-03	3.0144D-02
-4.0065D-02	-6.6139D-02	-3.9946D-02	-6.4497D-02	-4.0773D-02	3.7497D-03
-6.2510D-03	8.3870D-04	3.1594D-02	-2.1174D-02	6.5786D-02	2.1193D-03
3.7824D-02	-2.4105D-02	1.5467D-02	-1.0974D-02	-1.0776D-03	4.4859D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

8.7506D-02	1.0181D-03	-1.4352D-02	2.3807D-02	-4.4968D-02	7.5453D-02
-6.4048D-02	-7.8443D-03	-2.7650D-02	-7.7215D-03	-6.9215D-02	-9.2044D-03
-5.3425D-03	7.0000D-02	2.9968D-03	1.9056D-02	-4.3029D-03	6.3874D-02
-4.0132D-02	-3.2565D-02	2.3297D-02	-2.8706D-02	-1.1138D-02	-4.7477D-02
6.4279D-02	-2.0751D-02	3.1660D-02	-6.0530D-02	4.8732D-02	-4.9295D-02
-1.1884D-03	1.7521D-02	-3.7831D-02	-2.3994D-02	-1.5920D-02	-1.1477D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 18

9.6138D-04	-1.0056D-03	6.3586D-04	-1.0012D-03	1.0268D-03	-6.4678D-04
1.7286D-02	-1.1263D-02	-3.3267D-02	-2.1416D-02	1.5946D-02	3.2676D-02
-2.8400D-02	-3.1218D-02	-7.6050D-04	2.5389D-02	2.9199D-02	5.8752D-03
-2.4920D-02	-3.6410D-02	3.6311D-02	2.5905D-02	-1.2056D-02	9.8429D-03
-2.8017D-02	-9.3400D-03	-7.4827D-03	-2.6759D-02	3.5323D-02	3.5925D-02
7.0300D-03	6.8509D-03	8.8863D-03	8.4678D-03	7.7459D-03	8.4289D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

$G_3 =$

6.7050D-02	5.7904D-02	-6.9768D-05	7.4297D-05	-5.3197D-05	-2.3962D-04
-2.4962D-02	-2.4385D-03	-2.2213D-02	1.9416D-02	-2.0504D-03	-1.7381D-02
-2.1980D-03	2.4142D-02	-1.5986D-02	-8.8429D-03	2.1255D-02	-1.2394D-02
6.3352D-03	9.9012D-03	3.3262D-04	2.5487D-02	-2.2981D-02	2.5208D-04
-1.0152D-02	6.3762D-03	2.5273D-02	-1.3223D-02	-1.4356D-02	2.8199D-02
2.0730D-04	4.9984D-04	-3.2851D-02	-3.2895D-02	-3.4255D-02	-3.3326D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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$C_3 =$

Columns 1 thru 6

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
2.6506D-03	5.7393D-03	1.9278D-03	1.8574D-02	2.8984D-03	-1.7778D-02
4.7144D-03	-9.5223D-04	-4.6947D-03	3.0662D-02	-3.8888D-04	1.1330D-02
8.4079D-03	1.4938D-02	2.2221D-03	1.8519D-02	-1.4649D-02	-7.2701D-03
1.4872D-02	5.6825D-04	-1.4794D-02	2.9901D-02	9.8181D-03	5.1581D-03
-5.3923D-03	3.7732D-03	2.7365D-04	1.8903D-02	-3.0503D-02	5.0648D-04
-8.4367D-05	7.5842D-04	-6.7248D-03	-1.7384D-03	-9.8266D-04	-2.1085D-02
-1.7026D-02	1.4288D-02	1.1918D-03	1.8605D-02	-2.9805D-02	5.5860D-04
-1.9809D-04	1.7499D-03	-1.5616D-02	1.5097D-02	9.6218D-03	-8.2351D-03
2.7924D-03	6.1682D-03	-6.6855D-04	-1.0801D-02	-1.4680D-02	1.7782D-02
-4.6322D-03	1.7225D-03	-4.2511D-03	1.3308D-02	2.8066D-02	1.1278D-02
8.7495D-03	1.5441D-02	9.5991D-04	5.1634D-03	-2.2596D-02	7.4829D-03
-1.4681D-02	2.0533D-03	-1.4249D-02	2.2010D-02	2.2857D-02	5.3943D-03
-1.8706D-04	-3.8561D-03	6.3356D-03	1.1553D-02	1.2991D-02	-3.3043D-03
1.9567D-04	2.5126D-03	6.9643D-03	1.6880D-02	4.3308D-03	-3.2201D-03
-1.2372D-04	7.4213D-03	1.6966D-04	-1.6834D-02	3.4696D-03	-4.1768D-03
1.9481D-04	4.7775D-03	-5.6640D-03	-1.2010D-02	1.2408D-02	-3.9801D-03
-1.9978D-04	-3.5574D-03	-6.5138D-03	5.5890D-03	-1.6378D-02	-3.6408D-03
1.2584D-04	-7.2895D-03	-1.3107D-03	-4.5632D-03	-1.6657D-02	-3.9618D-03
-1.3623D-02	-2.5727D-02	-8.6415D-03	-4.0065D-02	-6.2510D-03	3.7824D-02
-2.4230D-02	4.2685D-03	2.1044D-02	-6.6139D-02	8.3870D-04	-2.4105D-02
-4.3212D-02	-6.6964D-02	-9.9608D-03	-3.9946D-02	3.1594D-02	1.5467D-02
-7.6436D-02	-2.5473D-03	6.6314D-02	-6.4497D-02	-2.1174D-02	-1.0974D-02
2.7714D-02	-1.6914D-02	-1.2267D-03	-4.0773D-02	6.5786D-02	-1.0776D-03
4.3360D-04	-3.3997D-03	3.0144D-02	3.7497D-03	2.1193D-03	4.4859D-02
8.7506D-02	-6.4048D-02	-5.3425D-03	-4.0132D-02	6.4279D-02	-1.1884D-03
1.0181D-03	-7.8443D-03	7.0000D-02	-3.2565D-02	-2.0751D-02	1.7521D-02
-1.4352D-02	-2.7650D-02	2.9968D-03	2.3297D-02	3.1660D-02	-3.7831D-02
2.3807D-02	-7.7215D-03	1.9056D-02	-2.8706D-02	-6.0530D-02	-2.3994D-02
-4.4968D-02	-6.9215D-02	-4.3029D-03	-1.1138D-02	4.8732D-02	-1.5920D-02
7.5453D-02	-9.2044D-03	6.3874D-02	-4.7477D-02	-4.9295D-02	-1.1477D-02
9.6138D-04	1.7286D-02	-2.8400D-02	-2.4920D-02	-2.8017D-02	7.0300D-03
-1.0056D-03	-1.1263D-02	-3.1218D-02	-3.6410D-02	-9.3400D-03	6.8509D-03
6.3586D-04	-3.3267D-02	-7.6050D-04	3.6311D-02	-7.4827D-03	8.8863D-03
-1.0012D-03	-2.1416D-02	2.5389D-02	2.5905D-02	-2.6759D-02	8.4678D-03
1.0268D-03	1.5946D-02	2.9199D-02	-1.2056D-02	3.5323D-02	7.7459D-03
-6.4678D-04	3.2676D-02	5.8752D-03	9.8429D-03	3.5925D-02	8.4289D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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Columns 7 thru 12

-1.5785D-03	1.0424D-02	3.0356D-05	-1.2267D-02	1.5086D-03	8.9732D-04
2.8581D-03	1.8925D-03	-9.0375D-03	-2.1073D-03	1.0080D-02	7.0749D-04
-3.7110D-04	-2.0338D-03	1.0465D-02	7.1948D-03	-8.7078D-03	-3.5375D-04
-1.3109D-04	1.1814D-02	2.0097D-04	-1.7066D-02	6.5081D-03	4.2241D-04
-1.9616D-03	9.9896D-03	1.0156D-03	-8.1380D-03	1.3307D-02	-1.6187D-04
2.9374D-06	6.7967D-04	-6.9868D-03	1.0454D-02	6.5385D-03	1.2296D-02
2.8139D-06	-8.7829D-04	8.8542D-03	-5.5254D-03	-3.5372D-03	-1.3432D-02
1.7070D-03	1.0691D-02	1.1069D-03	-1.3211D-02	2.1559D-02	-2.6574D-04
-1.5796D-03	1.0202D-02	2.0346D-03	4.2973D-03	1.1620D-02	-1.0427D-03
-2.8721D-03	-8.0545D-05	-9.2576D-03	7.9837D-03	-6.4205D-03	9.2118D-04
3.8489D-04	-7.8024D-05	1.0679D-02	-4.4577D-03	1.0326D-02	-5.8418D-04
-1.3138D-04	1.1595D-02	2.1611D-03	2.0076D-03	1.8171D-02	-6.9181D-04
1.0687D-03	7.5833D-03	2.0602D-03	1.3637D-02	1.6871D-03	-9.9574D-03
-1.7798D-03	-3.5213D-04	-9.3791D-03	-7.2491D-04	-1.4843D-02	-6.0999D-03
-1.3943D-03	-2.4341D-04	1.0341D-02	7.2150D-03	2.0846D-02	6.9761D-03
-7.4777D-04	9.2239D-03	1.7324D-03	1.1590D-02	8.3296D-03	-1.1067D-02
3.3608D-03	8.5497D-03	8.4431D-04	4.7668D-03	-7.7364D-03	7.0397D-05
-4.1804D-06	1.0966D-03	-1.0884D-02	-1.1288D-02	-6.9094D-03	-1.7977D-03
6.3873D-06	-1.2435D-03	1.2269D-02	1.7802D-02	1.0901D-02	1.5768D-03
4.9972D-04	1.0003D-02	9.9126D-04	2.5584D-03	-4.1585D-03	4.7716D-05
1.0789D-03	7.8783D-03	-5.2384D-04	-7.7743D-03	-1.1209D-02	1.0052D-02
1.7601D-03	2.2200D-03	-9.0832D-03	-1.3485D-02	6.0081D-03	-6.3160D-03
1.4095D-03	-1.8608D-03	1.0138D-02	2.1783D-02	-2.9160D-03	7.1933D-03
-7.4143D-04	9.4270D-03	1.4337D-04	-1.2785D-02	-6.3718D-03	1.1062D-02
6.7344D-05	1.0137D-02	1.0130D-03	-2.2179D-03	3.6563D-03	-1.4325D-05
9.7428D-04	1.0073D-03	-1.0137D-02	-3.6623D-03	-2.2103D-03	-1.0042D-04
1.4496D-05	-7.5626D-04	1.1819D-02	9.4525D-03	8.3023D-03	1.1783D-04
8.3109D-05	1.1821D-02	1.5333D-03	-4.9135D-03	1.1551D-02	-6.4152D-04
1.6682D-03	-9.3252D-06	-7.1080D-07	-5.7103D-06	-4.2335D-06	-1.2559D-05
8.4728D-03	-2.4349D-02	-2.5705D-03	6.2355D-03	-9.9593D-03	1.0503D-04
-1.4531D-02	-2.4506D-03	2.4261D-02	9.9442D-03	6.1583D-03	2.7816D-04
3.0897D-05	-3.6049D-03	3.5196D-02	-2.8392D-02	-1.7333D-02	-8.6633D-04
1.9590D-04	3.5260D-02	3.5376D-03	1.7381D-02	-2.8410D-02	2.5183D-04
-3.3667D-02	-2.4214D-02	-2.6149D-03	5.9330D-03	-9.9141D-03	2.4414D-04
5.7904D-02	-2.4385D-03	2.4142D-02	9.9012D-03	6.3762D-03	4.9984D-04
-3.3267D-02	-2.3803D-02	-2.2651D-03	6.2732D-03	-9.6789D-03	-1.2425D-04
-5.8165D-02	-2.0509D-03	2.4711D-02	1.0104D-02	6.1203D-03	3.4344D-04
6.7050D-02	-2.4962D-02	-2.1980D-03	6.3352D-03	-1.0152D-02	2.0730D-04
2.1477D-04	-2.6068D-03	2.4119D-02	9.7217D-03	6.0470D-03	8.1302D-05
3.2233D+01	8.0021D+01	2.6879D+01	5.3819D+02	8.3996D+01	-5.2226D+02

5.7331D+01	-1.3277D+01	-6.5458D+01	8.8844D+02	-1.1270D+01	3.3284D+02
1.0225D+02	2.0828D+02	3.0983D+01	5.3660D+02	-4.2454D+02	-2.1357D+02
1.8086D+02	7.9229D+00	-2.0627D+02	8.6639D+02	2.8453D+02	1.5153D+02
-6.5575D+01	5.2608D+01	3.8155D+00	5.4771D+02	-8.8398D+02	1.4879D+01
-1.0260D+00	1.0574D+01	-9.3763D+01	-5.0369D+01	-2.8477D+01	-6.1940D+02
-2.0705D+02	1.9921D+02	1.6618D+01	5.3909D+02	-8.6373D+02	1.6410D+01
-2.4089D+00	2.4399D+01	-2.1773D+02	4.3745D+02	2.7884D+02	-2.4192D+02
3.3958D+01	8.6001D+01	-9.3215D+00	-3.1295D+02	-4.2543D+02	5.2236D+02
-5.6331D+01	2.4017D+01	-5.9273D+01	3.8560D+02	8.1335D+02	3.3131D+02
1.0640D+02	2.1528D+02	1.3384D+01	1.4961D+02	-6.5483D+02	2.1982D+02
-1.7853D+02	2.8629D+01	-1.9868D+02	6.3776D+02	6.6238D+02	1.5847D+02
-2.2748D+00	-5.3765D+01	8.8336D+01	3.3475D+02	3.7647D+02	-9.7069D+01
2.3794D+00	3.5033D+01	9.7103D+01	4.8909D+02	1.2550D+02	-9.4596D+01
-1.5045D+00	1.0347D+02	2.3655D+00	-4.8776D+02	1.0055D+02	-1.2270D+02
2.3690D+00	6.6612D+01	-7.8972D+01	-3.4798D+02	3.5957D+02	-1.1692D+02
-2.4295D+00	-4.9599D+01	-9.0822D+01	1.6194D+02	-4.7464D+02	-1.0695D+02
1.5304D+00	-1.0164D+02	-1.8274D+01	-1.3222D+02	-4.8273D+02	-1.1638D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
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0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.3623D-02	-2.5727D-02	-8.6415D-03	-4.0065D-02	-6.2510D-03	3.7824D-02
-2.4230D-02	4.2685D-03	2.1044D-02	-6.6139D-02	8.3870D-04	-2.4105D-02
-4.3212D-02	-6.6964D-02	-9.9608D-03	-3.9946D-02	3.1594D-02	1.5467D-02
-7.6436D-02	-2.5473D-03	6.6314D-02	-6.4497D-02	-2.1174D-02	-1.0974D-02
2.7714D-02	-1.6914D-02	-1.2267D-03	-4.0773D-02	6.5786D-02	-1.0776D-03
4.3360D-04	-3.3997D-03	3.0144D-02	3.7497D-03	2.1193D-03	4.4859D-02
8.7506D-02	-6.4048D-02	-5.3425D-03	-4.0132D-02	6.4279D-02	-1.1884D-03
1.0181D-03	-7.8443D-03	7.0000D-02	-3.2565D-02	-2.0751D-02	1.7521D-02
-1.4352D-02	-2.7650D-02	2.9968D-03	2.3297D-02	3.1660D-02	-3.7831D-02
2.3807D-02	-7.7215D-03	1.9056D-02	-2.8706D-02	-6.0530D-02	-2.3994D-02
-4.4968D-02	-6.9215D-02	-4.3029D-03	-1.1138D-02	4.8732D-02	-1.5920D-02
7.5453D-02	-9.2044D-03	6.3874D-02	-4.7477D-02	-4.9295D-02	-1.1477D-02
9.6138D-04	1.7286D-02	-2.8400D-02	-2.4920D-02	-2.8017D-02	7.0300D-03
-1.0056D-03	-1.1263D-02	-3.1218D-02	-3.6410D-02	-9.3400D-03	6.8509D-03
6.3586D-04	-3.3267D-02	-7.6050D-04	3.6311D-02	-7.4827D-03	8.8863D-03
-1.0012D-03	-2.1416D-02	2.5389D-02	2.5905D-02	-2.6759D-02	8.4678D-03

1.0268D-03	1.5946D-02	2.9199D-02	-1.2056D-02	3.5323D-02	7.7459D-03
-6.4678D-04	3.2676D-02	5.8752D-03	9.8429D-03	3.5925D-02	8.4289D-03

$\mathbf{D}_{sy}$ =

Columns 1 thru 6

-2.0373D-08	-2.3906D-08	-8.3816D-09	-2.6514D-08	-4.9381D-08	4.9440D-10
-1.7390D-08	-3.5047D-08	-1.4688D-08	4.6499D-10	-6.9899D-09	-5.5307D-09
6.5413D-09	2.8167D-08	2.2123D-08	-4.1312D-09	2.3076D-08	3.2881D-09
-2.1291D-08	-3.7215D-08	-1.0809D-08	-4.0089D-08	-4.5597D-08	8.8299D-09
-3.8490D-09	-1.3167D-08	-1.3847D-08	-1.0610D-08	-1.1253D-08	9.7836D-10
-3.5279D-09	3.1264D-08	-1.5272D-09	2.9083D-08	5.4574D-10	-3.1173D-08
8.5705D-09	-3.5009D-08	8.3269D-09	-3.5330D-08	-8.8868D-10	5.9557D-08
-9.9106D-09	-3.9341D-08	-2.5075D-08	-2.0086D-08	5.6718D-08	5.5040D-10
1.8561D-08	1.2620D-08	1.2308D-08	1.4109D-08	-4.9252D-08	8.1364D-10
1.3045D-08	3.3121D-08	1.4975D-08	2.8136D-08	7.3344D-09	-6.1900D-09
-4.3636D-09	-2.8519D-08	-1.2033D-08	-2.5122D-08	-2.3569D-08	4.0948D-09
2.3969D-08	4.2307D-09	1.1282D-08	1.1767D-08	-4.5334D-08	-7.2994D-09
3.0494D-08	1.5369D-08	2.5695D-08	1.9684D-08	1.5348D-08	1.4546D-08
6.5772D-09	-2.0081D-09	1.1077D-08	-8.0061D-09	2.4147D-08	1.2081D-08
8.2143D-09	1.9286D-08	-1.1911D-08	2.0865D-08	-4.6877D-08	-2.1965D-08
4.5112D-08	2.2258D-08	3.4839D-08	2.4658D-08	3.1865D-09	1.5998D-08
-1.3693D-08	-1.3540D-08	1.5680D-08	-2.3961D-10	4.0690D-08	-3.2156D-10
-2.0977D-08	-4.1169D-08	-1.4139D-08	-2.2778D-08	1.1474D-10	1.1063D-08
3.0609D-08	4.1134D-08	2.0565D-08	3.2394D-08	5.5519D-11	-2.1363D-08
-7.8551D-09	1.0298D-09	2.7284D-08	4.9754D-12	3.1295D-08	-2.9696D-10
-2.6827D-08	8.6614D-09	-6.9603D-09	-1.1128D-08	1.5635D-08	-1.5075D-08
8.1338D-09	-1.5670D-08	-1.2062D-08	-2.0234D-08	-2.3980D-08	1.2861D-08
-5.0247D-08	-2.8187D-08	2.1353D-08	2.3333D-08	4.6833D-08	-2.2898D-08
-3.1125D-08	5.0050D-08	6.7908D-10	-2.0650D-08	3.0069D-09	-1.6086D-08
-6.9805D-09	-1.1443D-08	6.2109D-09	-6.2802D-09	-2.6593D-08	3.4275D-10
-1.4389D-08	-2.4226D-08	-8.5452D-09	-2.9870D-09	5.4689D-09	-7.8848D-11
1.4820D-08	1.9569D-08	1.3356D-08	3.0900D-09	-8.2702D-09	-5.1536D-09
-1.4159D-09	-1.3007D-08	1.0775D-08	-1.0143D-08	-3.3660D-08	2.9319D-09
-4.4353D-09	-7.8068D-09	-2.9035D-09	-4.3976D-09	9.0091D-09	6.0855D-11
-2.8626D-08	1.8109D-08	-4.3996D-08	2.0132D-08	-5.1793D-08	2.5586D-09
-1.6599D-08	-5.8352D-08	-1.6796D-08	-6.8125D-08	2.9855D-08	-3.6535D-08
1.6055D-08	-1.1754D-07	-1.1854D-08	-8.7885D-09	-3.4669D-09	-1.5354D-07
1.4684D-07	-1.8236D-08	1.3769D-08	1.4158D-08	1.0917D-07	-2.4539D-09
-7.0047D-08	-5.7057D-08	-8.9018D-08	-5.8547D-08	3.3419D-08	1.0314D-09
5.9768D-08	6.7880D-08	6.7782D-08	6.2903D-08	-1.0973D-07	-2.6496D-08
-6.9946D-08	-5.9442D-08	-8.7890D-08	-5.7022D-08	3.4093D-08	5.0467D-10
-5.9337D-08	-1.4681D-07	-6.6112D-08	-1.5639D-07	1.1811D-07	-3.7128D-08
3.5734D-08	1.0851D-07	2.9497D-08	1.1238D-07	-1.8020D-07	-3.6691D-09
-2.2012D-09	-2.8237D-08	2.3384D-09	-3.4065D-08	-3.1677D-09	-3.7887D-08
-5.2563D-02	-6.1955D-03	-2.2829D-02	7.5627D-03	3.4938D-03	-1.8460D-03
-5.4770D-03	-5.7731D-02	8.7709D-03	-1.2151D-02	9.7842D-03	-2.1853D-03
-2.0039D-02	9.6746D-03	-4.1637D-02	-7.8312D-03	2.6903D-03	3.8753D-03
7.3234D-03	-1.1748D-02	-8.2713D-03	-4.8829D-02	-1.0578D-02	4.0767D-03
4.0713D-03	9.2741D-03	-4.3413D-04	-1.1123D-02	-6.1007D-02	-1.3166D-03
5.1737D-04	-2.0005D-03	-2.8913D-03	4.0899D-03	1.0889D-03	-5.2692D-02

-5.7113D-04	-1.0386D-02	8.8441D-03	6.9714D-03	-8.2877D-03	5.4574D-04
3.0531D-03	5.5986D-03	4.1438D-03	3.8001D-03	-2.3596D-03	-2.1040D-02
-7.4004D-03	-1.6060D-03	1.2025D-02	2.4086D-03	5.5319D-03	1.6533D-03
5.7613D-03	4.6590D-03	-5.4142D-03	-1.0638D-03	-1.2595D-02	-1.7814D-04
1.0153D-02	5.0336D-03	1.3148D-03	-8.0185D-04	5.3057D-04	4.5423D-04
-5.3660D-03	-3.7608D-04	4.2342D-03	9.0486D-03	1.3059D-02	5.1342D-03
-1.1722D-03	9.7534D-05	-5.9285D-04	-4.6419D-04	8.0627D-04	-1.0733D-03
3.5546D-03	2.3996D-03	1.3659D-03	2.1177D-03	-4.4967D-05	-1.8434D-03
-7.1663D-04	-3.1775D-03	9.2276D-04	-2.1689D-03	-7.3979D-04	1.6962D-03
1.0817D-03	-5.5069D-04	-2.0330D-03	-7.2543D-04	-2.3629D-03	9.2339D-04
-6.2380D-05	1.6785D-03	6.7285D-04	2.9752D-03	4.3325D-03	-3.1385D-04
-1.2834D-03	-2.1803D-03	-1.2755D-03	-2.9809D-03	-2.4904D-03	1.4871D-03
-2.1826D-19	9.5895D-19	2.5045D-19	1.9197D-19	1.6808D-21	6.7903D-19
-2.2910D-19	-7.0632D-19	2.7212D-19	-2.3706D-19	1.7012D-19	-3.8436D-19
-2.4866D-19	3.0880D-19	-2.6638D-19	1.4221D-19	-8.5855D-20	3.7769D-19
5.8511D-20	-2.6368D-19	-3.1661D-19	-4.1996D-19	-6.1913D-20	-4.3041D-19
-3.6171D-20	6.9131D-19	-3.5589D-20	-2.4900D-19	-2.0384D-19	2.2620D-19
-9.3236D-19	-4.8357D-19	3.7182D-19	-5.9669D-19	-1.6292D-19	-4.5423D-19
-2.0673D-19	-5.2304D-19	1.2500D-19	6.1307D-19	1.7827D-19	1.4678D-20
-6.9200D-19	-3.4795D-19	-3.4824D-20	-3.4420D-19	-1.6126D-19	-5.4473D-19
-1.3234D-19	4.7945D-19	-7.2997D-20	6.7392D-20	1.4478D-19	6.0386D-19
-2.0441D-19	1.7814D-19	-4.2802D-20	-3.2799D-19	-2.9106D-19	5.0378D-20
-3.4306D-19	2.1515D-19	1.8565D-19	2.3545D-20	-9.9844D-20	2.9291D-19
-1.6815D-19	-2.5861D-20	2.1705D-20	3.3985D-19	3.5692D-19	-3.6639D-20
1.8704D-20	-2.5085D-19	5.4591D-20	1.4237D-19	7.5793D-20	8.8143D-20
2.7580D-19	8.6966D-20	-6.0167D-20	4.2984D-20	-4.0218D-20	7.0079D-20
5.4875D-20	7.1700D-21	-5.1202D-20	-1.2868D-20	9.3667D-20	-8.1726D-20
6.3900D-20	-1.9991D-20	4.8076D-21	1.4245D-19	6.6029D-20	1.0327D-19
2.0898D-19	7.0267D-20	-9.1787D-20	-1.0286D-19	5.8882D-20	9.2217D-20
7.2636D-20	8.3476D-20	-1.3934D-19	1.1103D-19	2.6791D-20	-7.8743D-20
1.2386D-06	1.2244D-07	7.4405D-07	1.6431D-08	-1.1955D-07	-4.7171D-08
1.2244D-07	1.3613D-06	1.2649D-08	7.0759D-07	-9.0603D-08	-3.2382D-08
7.4405D-07	1.2649D-08	8.9885D-07	8.1306D-08	-1.6580D-07	-2.0544D-08
1.6431D-08	7.0759D-07	8.1306D-08	8.6483D-07	7.5922D-08	-1.6674D-07
-1.1955D-07	-9.0603D-08	-1.6580D-07	7.5922D-08	1.4359D-06	-7.5772D-09
-4.7171D-08	-3.2382D-08	-2.0544D-08	-1.6674D-07	-7.5772D-09	1.1647D-06
-1.3759D-07	5.7710D-08	-1.4351D-07	-2.2848D-08	7.2995D-07	-2.4677D-08
-4.0884D-08	-1.8204D-07	-3.4696D-08	-9.5359D-08	-2.0576D-08	7.2289D-07
5.8865D-09	1.8581D-08	-1.7793D-07	-3.3769D-08	-1.1436D-07	5.0369D-08
-2.4647D-08	-1.5772D-07	6.4134D-08	-1.4118D-07	9.3165D-08	-3.7818D-08
-1.9021D-07	-6.0873D-08	-8.1615D-08	-1.1233D-08	-1.6485D-07	2.5463D-08
3.5000D-08	-1.4147D-07	-8.7572D-10	-1.5633D-07	-7.2144D-08	-1.5549D-07
-5.8697D-08	-4.5433D-08	2.9331D-09	-3.3536D-08	4.3969D-08	2.6712D-08
-2.3333D-08	-3.6798D-08	-7.3233D-08	-3.4017D-08	-4.3458D-08	2.6750D-08
2.3058D-08	3.7064D-08	-4.5088D-09	7.7571D-08	6.8937D-08	-2.8137D-08
1.1443D-08	7.1530D-08	3.4923D-08	1.1988D-08	4.3219D-08	-1.9706D-09
1.2857D-09	-5.1412D-08	-2.1643D-08	-5.5694D-08	-4.3430D-08	1.4998D-09
4.4980D-08	2.4296D-08	3.9052D-08	4.4314D-08	-6.7555D-08	-2.5718D-08

Columns 7 thru 12

-1.9245D-08	-6.0483D-09	1.8360D-08	-1.3058D-08	1.1490D-08	-1.4384D-08

-1.9878D-08	1.2325D-08	-1.2544D-08	3.3299D-08	-1.3752D-08	2.8880D-08
3.0675D-08	-2.1288D-08	4.0579D-09	-2.8840D-08	1.1891D-08	-2.5129D-08
-2.6391D-08	-1.0361D-08	2.3614D-08	-4.2309D-09	1.1273D-08	-1.1963D-08
-2.7140D-08	5.7744D-10	-3.4806D-09	1.3160D-08	-1.2931D-08	1.1176D-08
-3.1003D-10	-1.5835D-10	4.1271D-09	3.2019D-08	2.5958D-09	3.0600D-08
7639D-10	-1.2911D-08	-9.0230D-09	-3.5437D-08	-8.6336D-09	-3.6660D-08
-3.5704D-08	5.6945D-10	-9.3904D-09	3.9826D-08	-2.2855D-08	2.1300D-08
-1.9462D-08	8.2548D-09	-1.9345D-08	2.4273D-08	-6.8426D-09	2.7130D-08
1.9982D-08	1.1642D-08	1.6844D-08	-3.5522D-08	1.3361D-08	-2.9237D-10
-3.0761D-08	-1.9799D-08	-5.9518D-09	2.8788D-08	-2.0817D-08	-3.1703D-09
-2.6447D-08	1.3069D-08	-2.0043D-08	3.7761D-08	-8.4406D-09	4.1163D-08
1.2917D-08	1.7053D-08	-2.5727D-08	-8.7482D-09	-6.7216D-09	1.1779D-08
2.6026D-08	2.0936D-09	-9.3793D-09	-1.6789D-08	1.1161D-08	-2.0582D-08
-3.8827D-08	-2.2842D-09	5.0738D-08	-2.7180D-08	-2.0563D-08	2.3870D-08
7.6728D-09	2.7322D-08	-3.0057D-08	-5.0829D-08	1.1156D-09	2.0945D-08
3.6672D-08	-8.2677D-10	-1.3499D-08	1.3366D-08	1.6159D-08	4.2570D-10
4.1774D-11	3.6190D-09	1.9914D-08	-4.2098D-08	1.2287D-08	-2.3982D-08
-1.1853D-10	-4.3676D-09	-2.9228D-08	4.2073D-08	-1.7957D-08	3.4019D-08
3.1821D-08	-7.6677D-11	-7.5091D-09	-1.4259D-09	2.7479D-08	-1.1634D-10
1.3688D-08	-1.7940D-08	2.9613D-08	-1.5804D-08	2.3532D-08	-2.0021D-08
-2.6537D-08	3.9165D-09	-6.3508D-09	-2.2410D-09	-1.0981D-08	-8.4240D-09
3.9432D-08	-4.9931D-09	-7.8262D-09	1.9406D-08	1.3143D-08	2.2259D-08
8.7678D-09	-2.6846D-08	4.4412D-08	-2.2756D-08	3.2486D-08	-2.4844D-08
-4.3913D-09	6.1262D-10	-6.3393D-09	1.1472D-08	6.9394D-09	6.4275D-09
3.1364D-09	1.0033D-08	8.5799D-09	-1.5597D-08	4.4852D-09	1.6707D-09
-4.6033D-09	-1.3531D-08	-1.9470D-08	2.5948D-08	-1.1448D-08	1.0362D-08
-1.4571D-08	8.6915D-10	-7.9883D-09	2.1828D-08	6.3987D-09	1.4581D-08
5.1812D-09	-3.0953D-10	-4.5349D-09	7.7281D-09	-2.3493D-09	4.6431D-09
-6.2383D-08	4.4838D-09	-2.6989D-08	-1.6011D-08	-4.0315D-08	-2.2736D-08
2.3609D-08	-5.3930D-08	-1.7621D-08	-9.9642D-09	-2.1996D-08	-2.0090D-08
-3.7648D-09	3.8032D-10	-2.1559D-08	-1.2430D-07	7.6517D-09	-2.5678D-08
1.8873D-08	-5.6071D-09	1.4346D-07	1.6947D-08	3.6922D-09	-1.3683D-08
3.0916D-08	-1.1337D-09	-7.5671D-08	6.2311D-08	-8.5410D-08	6.4248D-08
-1.1087D-07	-3.6290D-08	6.2993D-08	-1.4090D-07	5.5743D-08	-1.5845D-07
2.8274D-08	2.4503D-10	-5.8085D-08	5.5974D-08	-6.7691D-08	5.3321D-08
1.2679D-07	-5.5382D-08	-5.4160D-08	6.5666D-08	-5.6177D-08	6.2956D-08
-1.9285D-07	5.7943D-09	3.2373D-08	-1.1958D-07	2.1096D-08	-1.3161D-07
-2.9737D-09	-5.1789D-08	-1.8116D-09	-3.4649D-08	-4.8003D-09	-4.7255D-08
-2.2426D-03	7.7391D-04	-9.3748D-03	3.3434D-03	7.4968D-03	-8.2432D-03
-1.1001D-02	3.8974D-03	-1.2850D-03	5.8278D-03	3.1151D-03	-2.6299D-04
8.9358D-03	1.1939D-03	7.1964D-03	-6.2058D-03	1.0857D-03	2.0998D-03
7.4436D-03	5.1499D-03	3.9754D-03	-1.3380D-03	1.7098D-04	9.7126D-03
-7.6168D-03	-6.5299D-04	4.6761D-03	-1.0141D-02	2.0198D-03	1.1995D-02
3.9491D-04	-2.3770D-02	-5.2859D-03	-1.2122D-03	4.4472D-04	8.8966D-04
-5.3027D-02	3.1573D-03	-1.1949D-03	1.0270D-02	8.0020D-03	-7.5771D-03
1.1396D-03	-4.0680D-02	2.3137D-03	5.4638D-03	-2.2789D-03	6.8570D-03
-2.4889D-04	1.5806D-04	-4.8580D-02	5.0630D-03	-1.9274D-02	-3.7191D-03
1.0230D-02	6.9274D-03	5.3621D-03	-5.7693D-02	-6.5395D-03	-1.0510D-02
6.0947D-03	-3.3685D-03	-2.4025D-02	-7.8928D-03	-4.3431D-02	1.6002D-03
-6.5747D-03	3.3205D-03	-8.0908D-03	-1.0752D-02	4.9707D-03	-5.2854D-02
-4.2578D-03	2.2638D-04	-2.6938D-03	6.0397D-04	-2.5219D-03	-1.5948D-04

5.2993D-03	8.8269D-04	-1.6080D-03	2.1852D-03	1.4144D-03	2.1881D-03
-8.1635D-04	-4.0278D-03	4.5829D-04	1.5001D-03	-1.4765D-03	-2.5416D-03
-2.7161D-03	3.0558D-03	-2.8460D-04	-6.7822D-04	-1.0520D-04	1.0363D-03
2.0200D-03	2.3383D-03	-9.2833D-04	-8.8314D-04	2.5522D-03	-5.1694D-04
1.2760D-03	-2.1034D-03	1.1625D-03	-3.1887D-03	-1.0845D-03	-2.1534D-03
-2.1137D-19	2.1722D-19	3.7502D-19	-8.6159D-20	-5.9141D-19	4.6018D-19
-2.3865D-19	-1.1802D-19	2.6239D-19	-5.8366D-20	4.1711D-19	-2.6941D-19
6.9682D-20	-7.7996D-20	-4.2187D-19	1.5186D-19	-1.8173D-19	4.7074D-19
3.5919D-19	1.8400D-19	-1.4963D-19	3.3323D-19	1.8739D-19	9.2035D-20
9.8865D-20	4.0757D-20	5.7331D-19	-9.0262D-21	-2.4790D-19	3.4411D-20
1.4366D-20	3.4654D-19	9.0927D-19	2.0539D-19	-1.9796D-19	-3.6517D-19
1.0710D-19	4.6371D-20	-5.6021D-19	3.4945D-19	3.5246D-19	1.1165D-19
1.0729D-19	3.0640D-20	1.4653D-19	6.1421D-20	1.0034D-19	-9.8820D-20
-1.8435D-19	1.0221D-19	9.5469D-19	3.4978D-19	3.3631D-19	9.4848D-19
6.7831D-19	-1.1365D-20	7.8004D-19	6.5004D-19	3.8871D-20	2.8423D-19
5.0307D-19	3.3396D-19	2.4826D-19	7.7954D-19	3.2937D-19	6.9797D-19
-5.7569D-19	2.7095D-19	-5.1537D-20	-1.8624D-19	6.8561D-19	1.1541D-20
-4.3751D-20	6.1184D-20	-1.0890D-19	1.0853D-19	2.8109D-19	2.0444D-19
6.3743D-20	1.3405D-20	3.7258D-19	3.4338D-20	1.5420D-20	4.4559D-20
6.1013D-21	3.1168D-20	-1.8240D-19	7.2865D-20	2.0960D-19	1.5942D-19
6.4987D-20	-6.3332D-20	-1.3404D-19	1.4180D-19	2.1813D-19	-1.8258D-20
-4.9489D-20	-4.5351D-20	3.4112D-19	1.9846D-20	5.2002D-20	1.3743D-19
1.6158D-19	7.3472D-20	-1.0163D-19	1.1464D-19	3.8315D-19	6.4864D-20
-1.3759D-07	-4.0884D-08	5.8865D-09	-2.4647D-08	-1.9021D-07	3.5000D-08
5.7710D-08	-1.8204D-07	1.8581D-08	-1.5772D-07	-6.0873D-08	-1.4147D-07
-1.4351D-07	-3.4696D-08	-1.7793D-07	6.4134D-08	-8.1615D-08	-8.7572D-10
-2.2848D-08	-9.5359D-08	-3.3769D-08	-1.4118D-07	-1.1233D-08	-1.5633D-07
7.2995D-07	-2.0576D-08	-1.1436D-07	9.3165D-08	-1.6485D-07	-7.2144D-08
-2.4677D-08	7.2289D-07	5.0369D-08	-3.7818D-08	2.5463D-08	-1.5549D-07
9.4022D-07	-5.5019D-08	-1.4311D-07	-6.2458D-08	-1.3298D-07	2.8243D-08
-5.5019D-08	8.1994D-07	3.3481D-08	-1.8931D-07	4.0618D-08	-1.0596D-07
-1.4311D-07	3.3481D-08	1.2251D-06	-1.1446D-07	7.0473D-07	1.0038D-08
-6.2458D-08	-1.8931D-07	-1.1446D-07	1.3738D-06	5.8349D-09	7.4755D-07
-1.3298D-07	4.0618D-08	7.0473D-07	5.8349D-09	8.0317D-07	-2.6079D-08
2.8243D-08	-1.0596D-07	1.0038D-08	7.4755D-07	-2.6079D-08	9.5903D-07
5.8927D-08	9.0116D-09	2.0437D-08	-3.8540D-08	6.9424D-08	-3.5207D-08
-5.7755D-08	1.1587D-08	5.5967D-08	-4.5503D-08	-7.1351D-09	-3.5247D-08
2.7490D-08	1.9267D-08	-4.5004D-08	2.4564D-08	-3.7403D-08	4.6579D-08
6.6284D-08	-4.6522D-08	-1.2835D-09	-5.1371D-08	1.8843D-08	-5.5846D-08
-6.5137D-08	-4.2569D-08	-1.0166D-08	7.3816D-08	-3.0545D-08	1.4257D-08
-2.7680D-08	2.4301D-08	-2.0090D-08	3.8479D-08	7.2257D-09	8.0549D-08

Columns 13 thru 18

-1.5390D-08	-5.6983D-09	-4.3882D-08	-5.3379D-09	-9.8034D-09	-1.4502D-08
-7.7568D-09	-8.0434D-09	1.9223D-08	-4.7589D-08	-9.0909D-10	-9.4763D-09
1.2110D-08	9.5432D-09	-2.2758D-08	6.2525D-08	-2.0156D-10	5.1698D-09
-1.2971D-08	-5.2847D-09	-5.9077D-08	-9.8469D-09	-1.0882D-08	-1.7033D-08
-1.1229D-09	1.1996D-09	1.6473D-08	-1.2996D-08	1.2994D-08	-1.6402D-08
-1.8908D-09	-1.8915D-09	-6.4563D-09	-6.7520D-09	-6.7775D-09	-6.4199D-09
8.0612D-09	8.0948D-09	8.2079D-09	1.5381D-08	1.5401D-08	8.2398D-09
3.1170D-09	-3.0469D-09	2.6331D-08	-2.0106D-08	2.0112D-08	-2.6285D-08

5.7195D-09	1.5483D-08	1.4437D-08	9.8239D-09	5.3726D-09	4.4025D-08
-8.0613D-09	-7.8313D-09	-9.4696D-09	-8.9901D-10	4.7668D-08	1.9152D-08
9.5535D-09	1.2156D-08	5.1729D-09	-2.5404D-10	6.2600D-08	-2.2697D-08
5.3023D-09	1.3012D-08	1.6987D-08	1.0893D-08	9.9078D-09	5.9144D-08
-6.9130D-10	1.3747D-08	2.2300D-09	1.0982D-09	-2.6414D-09	1.2471D-08
1.4683D-08	-1.0998D-08	-1.5260D-11	1.9977D-09	1.7422D-08	-7.9259D-09
-2.5167D-08	1.8638D-08	-6.7167D-09	-1.4430D-09	-2.6845D-08	9.7665D-09
3.2346D-09	2.0261D-08	5.4424D-09	8.5961D-09	-6.0734D-09	2.3495D-08
3.8595D-08	-3.8581D-08	4.1241D-09	-9.3970D-10	9.9274D-10	-4.0848D-09
2.8446D-08	2.8431D-08	8.9945D-09	1.7313D-08	1.7256D-08	8.9871D-09
-3.9763D-08	-3.9799D-08	-9.3479D-09	-1.7342D-08	-1.7328D-08	-9.3629D-09
4.9159D-08	-4.9172D-08	5.5891D-09	4.0384D-09	-4.0049D-09	-5.6044D-09
-1.3805D-08	6.9162D-10	-1.2399D-08	2.6832D-09	-1.0695D-09	-2.2376D-09
-1.1004D-08	1.4705D-08	-7.9110D-09	1.7409D-08	1.9460D-09	-2.9892D-11
1.8685D-08	-2.5170D-08	9.7836D-09	-2.6838D-08	-1.3662D-09	-6.7263D-09
-2.0292D-08	-3.2546D-09	-2.3451D-08	6.0401D-09	-8.5439D-09	-5.5196D-09
-3.9548D-10	3.8729D-10	9.2977D-09	8.9474D-09	-9.0626D-09	-9.4365D-09
-8.0572D-09	-1.3203D-08	7.5393D-09	3.0565D-09	8.1871D-09	2.4087D-09
1.1492D-08	1.2899D-08	-2.9502D-09	-6.8498D-10	-5.6741D-09	-1.0068D-08
5.9647D-09	2.9762D-09	1.1961D-08	1.2993D-08	-1.2342D-08	-8.8910D-09
4.3898D-09	-4.3408D-09	4.3894D-09	-4.3543D-09	4.3977D-09	-4.3430D-09
-1.1266D-08	1.1492D-08	6.1485D-10	-8.1552D-09	8.0002D-09	-8.0222D-10
5.4159D-09	3.0009D-09	-9.2926D-09	5.3592D-09	8.2800D-09	-1.2604D-08
1.9059D-09	2.3926D-09	1.5351D-08	-1.7316D-08	-1.7731D-08	1.5375D-08
-1.9377D-08	1.8872D-08	1.1273D-08	-7.2596D-09	7.6599D-09	-1.1321D-08
-6.9007D-09	6.4728D-09	5.0762D-09	-1.2085D-08	1.2112D-08	-4.3225D-09
-8.4724D-10	9.3798D-09	-1.5778D-08	1.2697D-08	-3.5474D-10	-5.7649D-09
-5.7420D-09	7.1385D-09	4.1322D-09	-1.1286D-08	1.1090D-08	-4.9611D-09
1.0766D-08	-9.1099D-10	-5.5879D-09	9.8663D-10	1.2293D-08	-1.6897D-08
-1.6267D-08	1.7169D-08	-6.4469D-09	-2.8691D-09	2.7794D-09	4.8481D-09
3.4771D-09	4.1326D-09	-1.0317D-08	6.6156D-09	6.3850D-09	-1.0284D-08
5.6059D-04	8.2143D-04	-2.4324D-03	-2.1368D-03	-2.9977D-03	-4.0645D-03
-1.2868D-03	7.9316D-04	-2.1470D-03	-2.8182D-04	3.1194D-03	2.7968D-03
-1.1279D-03	3.9680D-03	-1.3304D-03	1.1936D-03	3.8265D-03	-2.3250D-03
2.4385D-03	1.4587D-04	-1.3639D-03	-1.5937D-03	-4.1457D-04	-2.2209D-03
3.3993D-03	7.2369D-04	-2.3155D-04	-4.3147D-03	2.7342D-03	1.3099D-03
-2.3161D-04	-1.2469D-03	1.3546D-03	-2.6166D-03	-3.6282D-03	-1.6725D-03
-1.0115D-02	1.6388D-03	-1.3380D-03	-7.6023D-04	2.3802D-03	7.7416D-04
-8.2552D-04	-7.2186D-04	-1.1358D-03	5.1152D-03	8.1759D-04	1.7748D-03
-2.4799D-03	-2.6829D-03	2.1776D-04	4.4540D-03	1.2075D-03	4.4727D-03
4.5478D-03	1.6013D-03	5.2018D-04	2.1609D-03	1.4723D-03	-2.4453D-03
-4.0129D-03	2.8566D-03	2.3191D-03	-7.6652D-04	-5.2840D-04	-4.1134D-03
-2.5194D-03	-3.5250D-03	-2.6631D-03	3.0802D-03	-3.2059D-03	-3.2148D-03
-6.1058D-03	-1.9364D-04	-3.9959D-04	-7.4076D-04	-7.0566D-04	-7.0092D-04
2.0912D-03	-6.0944D-03	-1.7932D-03	-1.9484D-03	-2.8363D-04	-9.9911D-04
3.3363D-04	-2.2912D-04	-7.0712D-03	1.1835D-03	-1.7079D-03	-7.3555D-04
1.1767D-04	5.3553D-04	1.4099D-03	-4.8046D-03	-6.0917D-06	-1.9443D-03
-1.5946D-03	5.9814D-04	-9.7313D-04	-7.1596D-04	-5.2856D-03	1.1735D-03
-1.1893D-03	-8.9077D-04	-5.8769D-04	-9.8532D-04	-7.8684D-05	-4.8149D-03
-2.014[illegible]D-19	-1.4622D-19	3.3468D-20	-1.1136D-19	-1.5376D-20	-1.7419D-19
5.5186D-20	1.1257D-19	-6.4815D-20	2.2490D-19	1.7849D-19	9.6764D-20

-1.2411D-20	-2.8610D-19	-3.8396D-20	-1.1424D-19	-2.1556D-19	1.2844D-20
-2.7168D-20	1.6223D-19	-6.8431D-20	1.6029D-19	-1.4059D-19	2.8054D-19
-1.1491D-20	-9.2350D-20	1.0595D-19	-2.3535D-20	9.1248D-20	-1.0588D-21
8.6149D-20	-2.7753D-19	-7.6981D-20	2.9372D-19	1.7904D-19	-4.3466D-20
2.3082D-19	-1.9726D-19	1.7584D-19	-1.3138D-19	-4.0032D-20	-5.5603D-20
4.5649D-20	-2.3898D-19	-4.3856D-20	1.3534D-19	-1.9659D-19	8.9921D-20
2.6210D-20	-5.2868D-20	2.5607D-19	-7.0697D-20	9.3834D-20	2.0106D-19
1.7504D-19	-1.3945D-19	1.1255D-19	6.2932D-20	2.4131D-19	1.1888D-19
2.0335D-19	-1.4179D-19	1.2152D-19	-2.9917D-20	-7.9194D-20	3.5572D-19
2.0042D-19	-1.0428D-19	2.2389D-19	-7.6250D-20	-7.3599D-20	1.1060D-19
2.8344D-20	2.7704D-20	1.3299D-20	-5.7490D-20	-1.0568D-19	1.5331D-19
2.8611D-20	1.0614D-19	1.0831D-19	-7.4368D-20	9.3755D-20	-1.1646D-20
-4.6297D-20	1.2691D-19	1.1380D-20	3.9849D-20	-7.1998D-20	1.4619D-19
1.2474D-19	-4.2204D-20	1.1979D-19	-5.8728D-20	8.1042D-20	4.8167D-20
-5.2592D-20	1.4494D-19	-2.5251D-20	2.5497D-20	1.2116D-19	1.8323D-20
1.4222D-19	-4.0093D-20	9.0728D-20	-6.6824D-20	-4.0833D-20	1.5061D-19
-5.8697D-08	-2.3333D-08	2.3058D-08	1.1443D-08	1.2857D-09	4.4980D-08
-4.5433D-08	-3.6798D-08	3.7064D-08	7.1530D-08	-5.1412D-08	2.4296D-08
2.9331D-09	-7.3233D-08	-4.5088D-09	3.4923D-08	-2.1643D-08	3.9052D-08
-3.3536D-08	-3.4017D-08	7.7571D-08	1.1988D-08	-5.5694D-08	4.4314D-08
4.3969D-08	-4.3458D-08	6.8937D-08	4.3219D-08	-4.3430D-08	-6.7555D-08
2.6712D-08	2.6750D-08	-2.8137D-08	-1.9706D-09	1.4998D-09	-2.5718D-08
5.8927D-08	-5.7755D-08	2.7490D-08	6.6284D-08	-6.5137D-08	-2.7680D-08
9.0116D-09	1.1587D-08	1.9267D-08	-4.6522D-08	-4.2569D-08	2.4301D-08
2.0437D-08	5.5967D-08	-4.5004D-08	-1.2835D-09	-1.0166D-08	-2.0090D-08
-3.8540D-08	-4.5503D-08	2.4564D-08	-5.1371D-08	7.3816D-08	3.8479D-08
6.9424D-08	-7.1351D-09	-3.7403D-08	1.8843D-08	-3.0545D-08	7.2257D-09
-3.5207D-08	-3.6247D-08	4.6579D-08	-5.5846D-08	1.4257D-08	8.0549D-08
8.2200D-08	-1.1066D-08	1.5663D-08	1.6353D-08	1.5697D-08	-3.8547D-10
-1.1066D-08	8.2215D-08	-4.5955D-10	1.5575D-08	1.6381D-08	1.5619D-08
1.5663D-08	-4.5955D-10	8.2163D-08	-1.1100D-08	1.5617D-08	1.6309D-08
1.6353D-08	1.5575D-08	-1.1100D-08	8.2049D-08	-4.0640D-10	1.5527D-08
1.5697D-08	1.6381D-08	1.5617D-08	-4.0640D-10	8.2243D-08	-1.0981D-08
-3.8547D-10	1.5619D-08	1.6309D-08	1.5527D-08	-1.0981D-08	8.2297D-08

$\mathbf{D}_{37}$ =

5.1468D-09	6.4513D-09	6.4733D-09	4.3073D-09	-3.8335D-09	5.1774D-09
-9.8067D-10	-7.7619D-09	-5.4854D-09	2.5270D-09	7.9821D-09	-7.2321D-09
-2.9360D-09	6.5010D-09	8.8860D-09	-2.0930D-09	-1.1501D-08	9.8823D-09
4.1102D-09	6.0717D-09	8.5427D-09	3.6110D-09	-4.9484D-09	7.7577D-09
1.0329D-09	-2.6742D-09	-4.7711D-09	5.9264D-09	-9.1266D-11	-5.8454D-09
-4.0895D-10	-4.8387D-09	4.9864D-09	4.8575D-09	8.0799D-09	4.7678D-09
4.4313D-10	6.8113D-09	-6.0512D-09	-5.5415D-09	-1.2585D-08	-5.5152D-09
-4.9115D-09	-8.8283D-09	-7.2001D-09	7.2020D-09	-2.0597D-10	-7.0512D-09
4.8552D-09	-1.8081D-09	-3.0919D-09	-5.0177D-09	3.6693D-09	-4.3579D-09
9.2035D-10	1.7859D-09	1.8493D-09	-7.2849D-09	8.1329D-09	2.4925D-09
2.7804D-09	1.4075D-09	-1.8968D-09	1.0009D-08	-1.1707D-08	-2.1462D-09
3.6898D-09	-4.4446D-09	-3.1175D-09	-7.4955D-09	4.6779D-09	-3.6028D-09
-1.5483D-09	-2.0788D-09	-6.6838D-09	-7.0034D-09	-1.1896D-09	-7.1850D-09
-6.3262D-09	-1.2276D-10	1.6592D-09	-4.1416D-09	-7.4029D-09	2.7035D-09

1.3374D-08	5.0230D-09	-3.2456D-09	6.4833D-09	8.8223D-09	-3.4773D-09
5.7899D-10	-3.5639D-10	-8.6548D-09	-1.0845D-08	-1.2195D-09	-8.3879D-09
-1.1602D-08	-5.0028D-09	7.8527D-09	-8.8895D-09	3.8271D-11	8.8411D-09
2.5062D-10	4.2394D-09	-2.7215D-09	-9.0202D-10	-5.0315D-09	-6.9589D-10
-4.2974D-10	-5.1832D-09	2.7394D-09	1.8030D-09	4.2026D-09	1.4806D-09
-1.0048D-08	-2.4798D-09	1.1976D-08	-1.2458D-08	-1.2054D-11	1.2464D-08
-1.1925D-09	5.0748D-09	6.1890D-09	7.0373D-09	1.1963D-09	7.0490D-09
6.3884D-09	3.5147D-09	-3.4490D-09	2.6338D-09	-7.5665D-09	-3.9918D-09
-1.3753D-08	-8.6632D-09	7.6213D-09	-3.3383D-09	9.0133D-09	6.1342D-09
1.1083D-09	9.0800D-09	1.3761D-08	8.2805D-09	1.1477D-09	1.1015D-08
1.8887D-10	-1.9560D-10	4.4702D-09	-3.4098D-09	-2.3390D-11	3.5380D-09
-1.6229D-09	-1.4212D-09	-2.5210D-09	-2.0144D-09	4.0476D-09	-1.9302D-09
2.0538D-10	-6.0350D-10	3.8351D-09	3.1859D-09	-5.6686D-09	1.9564D-09
7.8016D-10	-6.9503D-10	6.1090D-09	-5.4245D-09	-2.0818D-11	4.1252D-09
-2.9836D-09	-2.5325D-09	-4.1854D-11	5.3679D-12	5.5258D-12	1.2676D-11
1.9042D-08	5.6799D-09	3.4803D-09	-4.5611D-09	-3.8700D-10	4.8810D-09
-1.1536D-08	-9.3741D-10	-2.2049D-09	-2.8268D-09	5.3261D-09	-2.3495D-09
4.0990D-09	4.5242D-09	-2.5494D-08	-2.5989D-08	5.0676D-08	-2.4428D-08
-2.7296D-09	3.2885D-09	-4.5288D-08	4.4083D-08	3.1711D-10	-4.4377D-08
-1.9687D-08	-2.7192D-08	3.5597D-09	-4.9911D-09	-4.0728D-10	5.6425D-09
5.0133D-08	5.2089D-08	-2.3146D-09	-1.2681D-09	4.7389D-09	-3.8345D-09
-1.8050D-08	-2.4170D-08	1.8579D-09	-3.9133D-09	5.0285D-10	3.6363D-09
-5.1080D-08	-3.3461D-08	-4.1075D-09	-2.7863D-09	6.8625D-09	-3.6140D-09
7.0108D-08	5.0133D-08	4.1837D-09	-6.1099D-09	1.3720D-09	4.2817D-09
3.0089D-09	1.0808D-08	-1.5669D-09	-2.9648D-09	4.9839D-09	-1.9936D-09
1.7180D-03	-5.8874D-04	3.5440D-03	-2.6797D-03	-9.2893D-04	2.2703D-03
-1.9083D-03	-6.6928D-04	-3.6525D-04	-1.8241D-03	3.2386D-03	2.2487D-04
-2.5160D-03	-3.8307D-03	6.6596D-04	-2.4717D-03	2.3253D-04	2.3768D-03
-4.0372D-03	-3.2202D-03	-1.6209D-03	9.1109D-04	1.7877D-03	-2.2840D-03
-1.5844D-03	1.0667D-03	2.8871D-03	-6.7010D-03	1.6126D-04	2.7275D-03
-1.0655D-04	7.2378D-04	-6.6016D-03	-3.3674D-03	4.6586D-03	-6.8556D-03
1.2745D-02	5.6635D-03	2.0699D-03	1.1842D-03	-3.2462D-04	2.1246D-03
5.0263D-04	3.0150D-03	-2.0976D-03	2.2217D-04	8.0309D-04	-1.6876D-03
1.3306D-03	-9.0958D-04	5.9918D-03	-3.6934D-03	6.9706D-04	6.1811D-03
1.7083D-03	1.3196D-03	1.0588D-03	-1.9573D-03	3.3096D-03	1.5438D-03
-1.7265D-03	-2.5307D-03	-1.4321D-03	-4.3523D-04	1.3874D-04	-1.4185D-03
5.2829D-03	8.1832D-03	-3.2191D-03	-1.7768D-03	1.8501D-03	-3.7410D-03
2.3348D-04	-2.9175D-05	-2.6847D-04	3.6756D-04	-1.8250D-04	3.3382D-06
-2.6933D-04	-5.5515D-04	1.0794D-03	3.5932D-04	-1.7211D-04	1.1529D-03
1.1500D-03	-7.3005D-04	-1.2226D-05	7.5347D-04	-1.6241D-03	4.3621D-05
-1.9520D-03	1.4325D-03	-5.6189D-04	-2.1358D-03	2.8745D-03	-2.6096D-04
1.7185D-03	2.0228D-03	-9.6404D-05	1.6401D-03	2.8763D-03	-2.7889D-04
-8.7351D-04	-1 1835D-03	-9.8825D-04	2.5930D-04	-1.5725D-03	-1.1358D-03
-8.6857D-20	7.2362D-21	-2.7618D-19	1.3657D-19	1.9937D-19	8.5496D-21
9.5291D-21	-2.2178D-20	1.9846D-19	9.0685D-20	-9.2800D-20	-6.3809D-20
-1.0187D-19	-1.8529D-22	-1.6283D-19	1.3691D-20	4.4535D-20	1.4139D-19
-3.4603D-20	-3.6009D-20	5.2664D-20	-8.9227D-20	-1.2935D-19	-6.7779D-20
1.9978D-20	-2.9342D-20	-7.3302D-20	1.2360D-19	6.8313D-20	-5.1484D-20
-2.7127D-21	2.4913D-20	2.4354D-19	2.3528D-19	-2.5402D-20	-1.0372D-19
1.3632D-20	3.0374D-20	-1.0327D-20	-3.3696D-20	-7.4986D-20	1.9503D-20
-4.2054D-20	2.8869D-21	2.7486D-20	1.2785D-19	1.9739D-20	-9.6667D-20

-6.4828D-20	-1.0348D-19	-2.8874D-19	2.8798D-19	3.8195D-20	-9.5759D-20
-2.8879D-20	-2.9183D-20	-3.7738D-20	1.9947D-19	-1.8875D-20	-5.0885D-20
-1.4324D-19	-1.0736D-19	-9.1861D-20	7.4010D-20	-4.7695D-20	1.2549D-20
7.1779D-20	-4.9118D-20	-7.9299D-20	9.8259D-22	-5.3089D-20	-1.1498D-21
-3.8612D-20	-4.6927D-20	3.9820D-20	-2.5772D-20	-5.0179D-20	1.3543D-20
5.5237D-20	-1.4781D-20	-1.0025D-21	2.9624D-20	3.3135D-21	-6.8037D-20
-3.4155D-20	-3.7178D-20	-4.4996D-20	-1.9361D-20	-4.5267D-20	-4.2045D-20
2.8118D-20	-1.7745D-20	3.2186D-20	-5.9196D-21	-6.9204D-20	1.9112D-20
-3.4725D-21	-8.1734D-21	-3.3985D-20	3.1413D-20	-2.1823D-21	1.3263D-20
1.7500D-20	-2.9714D-20	-7.0507D-20	-3.6255D-20	-3.7367D-20	3.2697D-20
3.5734D-08	5.9768D-08	-1.1363D-07	8.8354D-08	8.9392D-09	-1.0323D-07
1.0851D-07	6.7880D-08	6.6226D-08	3.8584D-08	-9.3758D-08	5.8453D-08
2.9497D-08	6.7782D-08	2.5707D-09	2.7398D-08	-3.5977D-09	-1.1773D-08
1.1238D-07	6.2903D-08	-2.6036D-09	1.3889D-08	-2.4062D-08	1.1297D-09
-1.8020D-07	-1.0973D-07	-7.8142D-08	7.6576D-08	5.8307D-10	-7.7785D-08
-3.6691D-09	-2.6496D-08	5.2644D-08	5.4466D-08	-1.1924D-07	5.6882D-08
-1.9285D-07	-1.1087D-07	-2.5032D-08	2.2255D-08	4.8111D-09	-2.5399D-08
5.7943D-09	-3.6290D-08	1.8535D-08	8.8793D-09	-1.0981D-08	1.6857D-08
3.2373D-08	6.2993D-08	-7.7544D-08	1.0235D-07	-1.0459D-08	-8.5741D-08
-1.1958D-07	-1.4090D-07	4.0940D-08	5.9724D-08	-9.6090D-08	3.8856D-08
2.1096D-08	5.5743D-08	-1.4551D-08	7.0328D-09	-1.7950D-09	-1.8926D-08
-1.3161D-07	-1.5845D-07	1.0724D-08	9.2909D-09	-3.0590D-08	1.5211D-08
-1.6267D-08	-8.4724D-10	6.1019D-09	-1.7396D-08	6.9946D-11	4.6844D-09
1.7169D-08	9.3798D-09	-1.6936D-08	4.1707D-09	-8.4057D-11	-1.6907D-08
-6.4469D-09	-1.5778D-08	-1.7422D-08	8.3006D-11	4.6791D-09	-1.7360D-08
-2.8691D-09	1.2697D-08	5.7195D-09	-2.6114D-11	-1.6909D-08	4.1363D-09
2.7794D-09	-3.5474D-10	-2.3567D-09	4.6195D-09	-1.7417D-08	4.9298D-11
4.8481D-09	-5.7649D-09	-2.0499D-09	-1.6874D-08	4.1329D-09	-4.8201D-11

6-State Modal Reduced Order Model

$\mathbf{F}_s =$

Columns 1 thru 6

-1.9457D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	-2.2308D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-2.2309D-01	0.0000D+00	0.0000D+00	0.0000D+00
1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	1.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

$\mathbf{B}_s =$

Columns 1 thru 6

-1.3623D-02	-2.4230D-02	-4.3212D-02	-7.6436D-02	2.7714D-02	4.3360D-04
-2.5727D-02	4.2685D-03	-6.6964D-02	-2.5473D-03	-1.6914D-02	-3.3997D-03
-8.6415D-03	2.1044D-02	-9.9608D-03	6.6314D-02	-1.2267D-03	3.0144D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns	7 thru	12			
8.7506D-02	1.0181D-03	-1.4352D-02	2.3807D-02	-4.4968D-02	7.5453D-02
-6.4048D-02	-7.8443D-03	-2.7650D-02	-7.7215D-03	-6.9215D-02	-9.2044D-03
-5.3425D-03	7.0000D-02	2.9968D-03	1.9056D-02	-4.3029D-03	6.3874D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns	13 thru	18			
9.6138D-04	-1.0056D-03	6.3586D-04	-1.0012D-03	1.0268D-03	-6.4678D-04
1.7286D-02	-1.1263D-02	-3.3267D-02	-2.1416D-02	1.5946D-02	3.2676D-02
-2.8400D-02	-3.1218D-02	-7.6050D-04	2.5389D-02	2.9199D-02	5.8752D-03
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

$G_s =$

6.7050D-02	5.7904D-02	-6.9768D-05	7.4297D-05	-5 3197D-05	-2.3962D-04
-2.4962D-02	-2.4385D-03	-2.2213D-02	1.9416D-02	-2.0504D-03	-1.7381D-02
-2.1980D-03	2.4142D-02	-1.5986D-02	-8.8429D-03	2.1255D-02	-1.2394D-02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

$C_s =$

0.0000D+00	0.0000D+00	0.0000D+00	-1.5785D-03	1.0424D-02	3.0356D-05
0.0000D+00	0.0000D+00	0.0000D+00	2.8581D-03	1.8925D-03	-9.0375D-03
0.0000D+00	0.0000D+00	0.0000D+00	-3.7110D-04	-2.0338D-03	1.0465D-02
0.0000D+00	0.0000D+00	0.0000D+00	-1.3109D-04	1.1814D-02	2.0097D-04
0.0000D+00	0.0000D+00	0.0000D+00	-1.9616D-03	9.9896D-03	1.0156D-03
0.0000D+00	0.0000D+00	0.0000D+00	2.9374D-06	6.7967D-04	-6.9868D-03
0.0000D+00	0.0000D+00	0.0000D+00	2.8139D-06	-8.7829D-04	8.8542D-03
0.0000D+00	0.0000D+00	0.0000D+00	1.7070D-03	1.0691D-02	1.1069D-03
0.0000D+00	0.0000D+00	0.0000D+00	-1.5796D-03	1.0202D-02	2.0346D-03
0.0000D+00	0.0000D+00	0.0000D+00	-2.8721D-03	-8.0545D-05	-9.2576D-03
0.0000D+00	0.0000D+00	0.0000D+00	3.8489D-04	-7.8024D-05	1.0679D-02
0.0000D+00	0.0000D+00	0.0000D+00	-1.3138D-04	1.1595D-02	2.1611D-03
0.0000D+00	0.0000D+00	0.0000D+00	1.0687D-03	7.5833D-03	2.0602D-03
0.0000D+00	0.0000D+00	0.0000D+00	-1.7798D-03	-3.5213D-04	-9.3791D-03
0.0000D+00	0.0000D+00	0.0000D+00	-1.3943D-03	-2.4341D-04	1.0341D-02
0.0000D+00	0.0000D+00	0.0000D+00	-7.4777D-04	9.2239D-03	1.7324D-03
0.0000D+00	0.0000D+00	0.0000D+00	3.3608D-03	6.5497D-03	8.4431D-04
0.0000D+00	0.0000D+00	0.0000D+00	-4.1804D-06	1.0966D-03	-1.0884D-02
0.0000D+00	0.0000D+00	0.0000D+00	6.3873D-06	-1.2435D-03	1.2269D-02
0.0000D+00	0.0000D+00	0.0000D+00	4.9972D-04	1.0003D-02	9.9126D-04
0.0000D+00	0.0000D+00	0.0000D+00	1.0789D-03	7.8783D-03	-5.2384D-04
0.0000D+00	0.0000D+00	0.0000D+00	1.7601D-03	2.2200D-03	-9.0832D-03
0.0000D+00	0.0000D+00	0.0000D+00	1.4095D-03	-1.8608D-03	1.0138D-02

0.0000D+00	0.0000D+00	0.0000D+00	-7.4143D-04	9.4270D-03	1.4337D-04
0.0000D+00	0.0000D+00	0.0000D+00	6.7344D-05	1.0137D-02	1.0130D-03
0.0000D+00	0.0000D+00	0.0000D+00	9.7428D-04	1.0073D-03	-1.0137D-02
0.0000D+00	0.0000D+00	0.0000D+00	1.4496D-05	-7.5626D-04	1.1819D-02
0.0000D+00	0.0000D+00	0.0000D+00	8.3109D-05	1.1821D-02	1.5333D-03
0.0000D+00	0.0000D+00	0.0000D+00	1.6682D-03	-9.3252D-06	-7.1080D-07
0.0000D+00	0.0000D+00	0.0000D+00	8.4728D-03	-2.4349D-02	-2.5705D-03
0.0000D+00	0.0000D+00	0.0000D+00	-1.4531D-02	-2.4506D-03	2.4261D-02
0.0000D+00	0.0000D+00	0.0000D+00	3.0897D-05	-3.6049D-03	3.5196D-02
0.0000D+00	0.0000D+00	0.0000D+00	1.9590D-04	3.5260D-02	3.5376D-03
0.0000D+00	0.0000D+00	0.0000D+00	-3.3667D-02	-2.4214D-02	-2.6149D-03
0.0000D+00	0.0000D+00	0.0000D+00	5.7904D-02	-2.4385D-03	2.4142D-02
0.0000D+00	0.0000D+00	0.0000D+00	-3.3267D-02	-2.3803D-02	-2.2651D-03
0.0000D+00	0.0000D+00	0.0000D+00	-5.8165D-02	-2.0509D-03	2.4711D-02
0.0000D+00	0.0000D+00	0.0000D+00	6.7050D-02	-2.4962D-02	-2.1980D-03
0.0000D+00	0.0000D+00	0.0000D+00	2.1477D-04	-2.6068D-03	2.4119D-02
2.6506D-03	5.7393D-03	1.9278D-03	3.2233D+01	8.0021D+01	2.6879D+01
4.7144D-03	-9.5223D-04	-4.6947D-03	5.7331D+01	-1.3277D+01	-6.5458D+01
8.4079D-03	1.4938D-02	2.2221D-03	1.0225D+02	2.0828D+02	3.0983D+01
1.4872D-02	5.6825D-04	-1.4794D-02	1.8086D+02	7.9229D+00	-2.0627D+02
-5.3923D-03	3.7732D-03	2.7365D-04	-6.5575D+01	5.2608D+01	3.8155D+00
-8.4367D-05	7.5842D-04	-6.7248D-03	-1.0260D+00	1.0574D+01	-9.3763D+01
-1.7026D-02	1.4288D-02	1.1918D-03	-2.0705D+02	1.9921D+02	1.6618D+01
-1.9809D-04	1.7499D-03	-1.5616D-02	-2.4089D+00	2.4399D+01	-2.1773D+02
2.7924D-03	6.1682D-03	-6.6855D-04	3.3958D+01	8.6001D+01	-9.3215D+00
-4.6322D-03	1.7225D-03	-4.2511D-03	-5.6331D+01	2.4017D+01	-5.9273D+01
8.7495D-03	1.5441D-02	9.5991D-04	1.0640D+02	2.1528D+02	1.3384D+01
-1.4681D-02	2.0533D-03	-1.4249D-02	-1.7853D+02	2.8629D+01	-1.9868D+02
-1.8706D-04	-3.8561D-03	6.3356D-03	-2.2748D+00	-5.3765D+01	8.8336D+01
1.9567D-04	2.5126D-03	6.9643D-03	2.3794D+00	3.5033D+01	9.7103D+01
-1.2372D-04	7.4213D-03	1.6966D-04	-1.5045D+00	1.0347D+02	2.3655D+00
1.9481D-04	4.7775D-03	-5.6640D-03	2.3690D+00	6.6612D+01	-7.8972D+01
-1.9978D-04	-3.5574D-03	-6.5138D-03	-2.4295D+00	-4.9599D+01	-9.0822D+01
1.2584D-04	-7.2895D-03	-1.3107D-03	1.5304D+00	-1.0164D+02	-1.8274D+01
-1.3623D-02	-2.5727D-02	-8.6415D-03	0.0000D+00	0.0000D+00	0.0000D+00
-2.4230D-02	4.2685D-03	2.1044D-02	0.0000D+00	0.0000D+00	0.0000D+00
-4.3212D-02	-6.6964D-02	-9.9608D-03	0.0000D+00	0.0000D+00	0.0000D+00
-7.6436D-02	-2.5473D-03	6.6314D-02	0.0000D+00	0.0000D+00	0.0000D+00
2.7714D-02	-1.6914D-02	-1.2267D-03	0.0000D+00	0.0000D+00	0.0000D+00
4.3360D-04	-3.3997D-03	3.0144D-02	0.0000D+00	0.0000D+00	0.0000D+00
8.7506D-02	-6.4048D-02	-5.3425D-03	0.0000D+00	0.0000D+00	0.0000D+00
1.0181D-03	-7.8443D-03	7.0000D-02	0.0000D+00	0.0000D+00	0.0000D+00
-1.4352D-02	-2.7650D-02	2.9968D-03	0.0000D+00	0.0000D+00	0.0000D+00
2.3807D-02	-7.7215D-03	1.9056D-02	0.0000D+00	0.0000D+00	0.0000D+00
-4.4968D-02	-6.9215D-02	-4.3029D-03	0.0000D+00	0.0000D+00	0.0000D+00
7.5453D-02	-9.2044D-03	6.3874D-02	0.0000D+00	0.0000D+00	0.0000D+00
9.6138D-04	1.7286D-02	-2.8400D-02	0.0000D+00	0.0000D+00	0.0000D+00
-1.0056D-03	-1.1263D-02	-3.1218D-02	0.0000D+00	0.0000D+00	0.0000D+00
6.3586D-04	-3.3267D-02	-7.6050D-04	0.0000D+00	0.0000D+00	0.0000D+00
-1.0012D-03	-2.1416D-02	2.5389D-02	0.0000D+00	0.0000D+00	0.0000D+00
1.0268D-03	1.5946D-02	2.9199D-02	0.0000D+00	0.0000D+00	0.0000D+00

-6.4678D-04	3.2676D-02	5.8752D-03	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	-1.3623D-02	-2.5727D-02	-8.6415D-03
0.0000D+00	0.0000D+00	0.0000D+00	-2.4230D-02	4.2685D-03	2.1044D-02
0.0000D+00	0.0000D+00	0.0000D+00	-4.3212D-02	-6.6964D-02	-9.9608D-03
0.0000D+00	0.0000D+00	0.0000D+00	-7.6436D-02	-2.5473D-03	6.6314D-02
0.0000D+00	0.0000D+00	0.0000D+00	2.7714D-02	-1.6914D-02	-1.2267D-03
0.0000D+00	0.0000D+00	0.0000D+00	4.3360D-04	-3.3997D-03	3.0144D-02
0.0000D+00	0.0000D+00	0.0000D+00	8.7506D-02	-6.4048D-02	-5.3425D-03
0.0000D+00	0.0000D+00	0.0000D+00	1.0181D-03	-7.8443D-03	7.0000D-02
0.0000D+00	0.0000D+00	0.0000D+00	-1.4352D-02	-2.7650D-02	2.9968D-03
0.0000D+00	0.0000D+00	0.0000D+00	2.3807D-02	-7.7215D-03	1.9056D-02
0.0000D+00	0.0000D+00	0.0000D+00	-4.4968D-02	-6.9215D-02	-4.3029D-03
0.0000D+00	0.0000D+00	0.0000D+00	7.5453D-02	-9.2044D-03	6.3874D-02
0.0000D+00	0.0000D+00	0.0000D+00	9.6138D-04	1.7286D-02	-2.8400D-02
0.0000D+00	0.0000D+00	0.0000D+00	-1.0056D-03	-1.1263D-02	-3.1218D-02
0.0000D+00	0.0000D+00	0.0000D+00	6.3586D-04	-3.3267D-02	-7.6050D-04
0.0000D+00	0.0000D+00	0.0000D+00	-1.0012D-03	-2.1416D-02	2.5389D-02
0.0000D+00	0.0000D+00	0.0000D+00	1.0268D-03	1.5946D-02	2.9199D-02
0.0000D+00	0.0000D+00	0.0000D+00	-6.4678D-04	3.2676D-02	5.8752D-03

$\mathbf{D}_{sy}$ =

Columns 1 thru 6

1.7970D-08	3.5018D-08	3.2648D-08	2.9292D-08	-4.8321D-09	2.2346D-10
-1.3856D-08	-2.5277D-08	1.6071D-08	-5.8631D-09	4.8700D-08	-2.2306D-09
-1.1836D-08	-7.1835D-09	-2.0143D-08	-2.4673D-08	-4.1366D-08	2.7739D-09
2.7737D-08	4.6478D-08	5.5714D-08	3.1257D-08	3.8031D-08	6.4650D-09
1.3789D-08	2.8014D-08	4.1459D-08	7.6236D-09	7.8608D-08	2.7954D-10
-4.0644D-09	-4.1264D-08	-3.4656D-09	-4.1184D-08	-1.3286D-10	1.2725D-08
-1.0098D-08	1.5423D-08	1.3947D-09	7.4482D-09	-3.8678D-10	1.3819D-08
1.8736D-08	2.7516D-08	6.4605D-08	9.5847D-09	2.0239D-07	-6.0057D-10
-2.5174D-09	-5.9920D-09	2.5682D-08	-2.4006D-08	-5.3243D-09	4.5828D-10
-5.2569D-09	-8.1966D-09	-2.2830D-08	-8.1170D-10	-4.8404D-08	-1.9813D-09
2.5279D-09	-4.9065D-09	2.4848D-08	-1.9527D-08	4.0563D-08	2.5812D-09
7.6333D-09	-3.3119D-09	4.7261D-08	-2.5956D-08	3.7586D-08	-6.1207D-09
-3.8242D-08	-3.4288D-08	-2.2046D-08	-4.0539D-08	-1.7009D-08	-1.3731D-08
-1.0654D-09	1.1284D-08	-2.8499D-08	2.3712D-08	-4.5844D-08	-1.0280D-08
-3.8925D-09	-2.7115D-08	2.3462D-08	-5.2170D-08	3.2737D-08	6.0004D-09
-2.3646D-08	-1.4964D-08	7.5618D-09	-3.5319D-08	9.6521D-09	-1.5408D-08
-2.4118D-08	-3.7616D-08	-1.6607D-08	-1.0992D-08	-1.1660D-08	1.7580D-11
1.0980D-08	1.7116D-08	1.1692D-09	4.3737D-08	6.9083D-10	9.8188D-10
-2.3238D-08	-4.8586D-08	-4.9753D-09	-7.1509D-08	-7.3180D-10	-9.5516D-09
-1.3420D-08	-1.1909D-08	9.9525D-09	-5.7637D-09	3.1664D-09	-8.3662D-11
2.9109D-08	2.8692D-08	1.0628D-09	3.5874D-08	-1.6430D-08	1.3643D-08
2.8257D-08	6.2125D-08	3.5090D-08	4.0064D-08	4.6858D-08	-1.0475D-08
-9.4154D-08	-1.4818D-07	-4.2221D-08	-8.2376D-08	-3.4121D-08	6.0925D-09
4.0273D-08	9.3288D-08	3.6108D-08	4.1984D-08	9.7544D-09	1.5279D-08
-2.1056D-09	-2.6935D-10	2.1387D-08	-1.3815D-09	-1.9592D-09	2.5377D-10
-2.7127D-09	-6.1570D-09	-2.9640D-09	1.8160D-08	5.7717D-09	-1.7760D-09
-1.6912D-08	-2.6659D-08	4.8998D-09	-5.5471D-08	3.6759D-09	-8.2284D-10

6.1082D-09	1.3025D-08	5.1825D-08	-4.2434D-09	3.7852D-08	1.2979D-09
-4.4507D-09	-7.7570D-09	-2.9106D-09	-4.3535D-09	9.0067D-09	1.7791D-11
-4.2303D-08	-1.3398D-08	-8.5838D-08	5.8039D-09	-1.1949D-07	3.0697D-09
-4.8361D-08	-1.0741D-07	-3.1576D-08	-1.2580D-07	2.9799D-08	-3.1885D-08
1.0643D-07	2.2681D-08	3.0854D-08	1.5553D-07	-2.0760D-09	-1.6701D-07
1.0891D-07	-1.0603D-07	-1.0443D-07	-2.4728D-08	-8.2694D-08	-1.2647D-09
-8.2462D-08	-8.7314D-08	-1.2970D-07	-7.1605D-08	-3.3146D-08	1.9170D-09
2.8640D-08	1.8656D-08	5.3890D-08	4.9187D-09	-1.0860D-07	-2.1103D-08
-8.4494D-08	-9.0715D-08	-1.2944D-07	-7.1791D-08	-3.2325D-08	3.2556D-10
-9.1379D-08	-1.9678D-07	-8.1384D-08	-2.1482D-07	1.1738D-07	-3.2226D-08
2.2129D-08	7.6322D-08	-1.2981D-08	9.7799D-08	-2.4915D-07	-2.8284D-09
-3.3787D-08	-7.5867D-08	-1.2262D-08	-9.0335D-08	-3.0775D-09	-3.3956D-08
-5.5638D-02	-7.9283D-03	-2.4817D-02	5.2614D-03	2.3122D-03	-3.3792D-03
-7.2098D-03	-6.2687D-02	6.4752D-03	-1.6664D-02	7.0064D-03	-8.5775D-04
-2.2027D-02	7.3790D-03	-4.4470D-02	-9.5688D-03	-1.0002D-03	3.2643D-03
5.0221D-03	-1.6261D-02	-1.0009D-02	-5.3557D-02	-1.1827D-02	4.8557D-03
2.8898D-03	6.4963D-03	-4.1246D-03	-1.2371D-02	-6.6999D-02	-1.2548D-03
-1.0159D-03	-6.7291D-04	-3.5023D-03	4.8689D-03	1.1507D-03	-5.4723D-02
-1.7322D-03	-1.3123D-02	5.2286D-03	5.7311D-03	-1.4154D-02	6.1330D-04
9.5593D-04	3.8845D-03	3.2275D-03	1.4526D-03	-2.3034D-03	-2.1660D-02
-4.8382D-03	-1.0036D-03	1.2541D-02	4.1664D-03	4.3582D-03	3.1959D-03
5.1404D-03	2.2328D-03	-4.2774D-03	-4.4602D-03	-9.8098D-03	1.1341D-03
1.0613D-02	3.8724D-03	-4.2353D-04	-6.6301D-04	-3.1466D-03	1.1069D-03
-7.1422D-03	-3.7514D-03	4.0726D-03	4.8168D-03	1.4353D-02	5.9315D-03
-2.6116D-03	-1.3577D-03	-8.1187D-04	-2.5875D-03	1.6409D-03	-1.2358D-03
1.7783D-03	1.6453D-04	1.0056D-04	-3.5319D-04	-9.0769D-04	-1.9944D-03
3.5526D-04	-5.5548D-04	2.4722D-03	1.1213D-04	1.2425D-03	1.1772D-03
1.6320D-03	1.3892D-03	-2.8374D-04	4.7167D-04	4.6281D-04	5.0310D-04
-6.1756D-04	1.0382D-03	-1.0445D-03	3.0306D-03	1.5255D-03	-6.9097D-04
-9.8330D-04	-1.3563D-03	-2.1477D-03	-1.4929D-03	-4.4434D-03	9.9596D-04
-1.9021D-19	1.1072D-18	1.1434D-19	2.4510D-19	9.8084D-20	6.5992D-19
-1.8291D-20	-6.2352D-19	2.5960D-19	-2.5427D-19	3.8281D-19	-3.9314D-19
-2.0072D-19	4.1690D-19	-2.1987D-19	2.2689D-19	2.3608D-19	3.6406D-19
2.5322D-19	-1.6049D-19	-4.3395D-19	-4.5574D-19	1.4161D-20	-4.4203D-19
2.4789D-20	7.7186D-19	1.6779D-19	-1.3028D-19	3.2529D-19	2.1632D-19
-1.0319D-18	-4.0652D-19	2.9432D-19	-5.3213D-19	-1.5474D-19	-4.6524D-19
-1.4617D-19	-4.4406D-19	3.2374D-19	7.2895D-19	6.9631D-19	5.0169D-21
-6.3298D-19	-2.5311D-19	-1.7649D-19	-3.4622D-19	-1.8008D-19	-5.5659D-19
-1.3520D-19	3.6502D-19	1.3985D-19	6.0907D-20	2.5610D-19	6.1885D-19
-4.7235D-20	1.8537D-19	-2.4389D-19	-4.5705D-19	-5.7026D-19	5.0881D-20
-3.1506D-19	2.0948D-19	3.8449D-19	8.5312D-20	2.2874D-19	2.9397D-19
3.4278D-21	4.1822D-20	-1.8111D-19	2.5202D-19	2.0787D-19	-4.3892D-20
8.4270D-20	-1.9093D-19	-8.5527D-20	1.1136D-19	-1.3268D-20	8.0903D-20
3.5820D-19	1.6981D-19	-1.4271D-19	4.5789D-20	2.0703D-20	6.0020D-20
-4.7742D-20	-4.6888D-20	-6.1380D-20	-2.1431D-20	-6.6409D-20	-7.5652D-20
1.5386D-22	-5.5686D-20	-8.4872D-20	1.0345D-19	-1.7775D-19	1.0729D-19
2.0089D-19	1.1008D-19	1.0373D-20	-2.9610D-20	3.1297D-19	8.6963D-20
8.6589D-21	8.2199D-20	-1.5379D-20	1.8104D-19	2.1457D-19	-7.9153D-20
1.4646D-06	2.5328D-07	8.9087D-07	1.8858D-07	-3.1498D-08	6.3542D-08
2.5328D-07	1.7291D-06	1.8430D-07	1.0430D-06	1.1613D-07	-1.2902D-07
8.9087D-07	1.8430D-07	1.1093D-06	2.1102D-07	1.0892D-07	2.3539D-08

1.8858D-07	1.0430D-06	2.1102D-07	1.2166D-06	1.6888D-07	-2.2374D-07
-3.1498D-08	1.1613D-07	1.0892D-07	1.6888D-07	1.8818D-06	-1.2084D-08
6.3542D-08	-1.2902D-07	2.3539D-08	-2.2374D-07	-1.2084D-08	1.3118D-06
-5.1052D-08	2.6139D-07	1.2563D-07	6.9492D-08	1.1666D-06	-2.9603D-08
1.1389D-07	-5.3588D-08	3.2980D-08	7.9773D-08	-2.4691D-08	7.6745D-07
-1.8196D-07	-2.8105D-08	-2.1515D-07	-1.6545D-07	-2.7118D-08	-6.1042D-08
2.3399D-08	2.1722D-08	-1.9701D-08	1.1110D-07	-1.1417D-07	-1.3333D-07
-2.2328D-07	2.4799D-08	4.8253D-08	-2.1898D-08	1.0878D-07	-2.1682D-08
1.6810D-07	1.0925D-07	1.1548D-08	1.5842D-07	-1.6848D-07	-2.1380D-07
4.7918D-08	6.3239D-08	1.9039D-08	1.2467D-07	-1.8104D-08	3.8177D-08
1.0837D-07	1.2993D-07	2.0753D-08	1.5007D-07	2.0795D-08	3.7371D-08
-5.7417D-08	-1.5770D-07	-1.2013D-07	-9.2041D-08	-7.8605D-08	9.6881D-09
-3.0176D-08	-7.2469D-08	-9.5543D-08	-7.6954D-08	-1.6708D-07	2.8551D-08
4.2028D-08	-3.3734D-09	1.0594D-07	-5.9629D-08	1.6549D-07	2.8871D-08
2.2000D-08	-3.6639D-08	1.0369D-07	-6.6255D-08	7.7790D-08	1.0079D-08

Columns 7 thru 12

2.4541D-08	2.2498D-08	-1.8184D-09	4.8005D-09	2.6097D-08	2.2691D-08
3.4575D-08	2.7648D-09	5.6121D-09	-8.8332D-09	2.3736D-08	-1.2377D-09
-3.2444D-08	-2.5732D-08	-3.0117D-09	-4.3745D-09	-2.5247D-08	-1.8319D-08
5.5689D-08	2.1496D-08	8.1939D-09	2.1867D-09	4.8538D-08	2.4126D-08
6.0841D-08	-4.4876D-10	1.4202D-08	-2.9110D-08	4.2262D-08	-8.7431D-09
-1.3214D-09	-1.9995D-08	3.9726D-09	-4.1141D-08	3.4637D-09	-4.0553D-08
9.1895D-10	-1.1097D-08	9.8612D-09	1.5645D-08	-1.3939D-09	7.0094D-09
1.0692D-07	-1.0332D-09	1.9221D-08	-2.8595D-08	6.6592D-08	-1.0875D-08
2.3376D-08	-2.1431D-08	1.8344D-08	-3.5442D-08	3.2939D-08	-2.9820D-08
-3.4662D-08	3.3716D-09	1.3039D-08	-2.5261D-08	-1.7606D-08	-5.7214D-09
3.2004D-08	-2.5680D-08	1.2248D-08	-7.1863D-09	2.1002D-08	-2.4811D-08
5.4536D-08	-2.0737D-08	2.8147D-08	-4.7178D-08	5.6591D-08	-3.2016D-08
-1.8898D-08	-3.1248D-08	2.9182D-08	-2.8187D-08	-4.2924D-10	-3.4333D-08
-4.2286D-08	1.9033D-08	-2.8896D-08	6.2222D-08	-3.5035D-08	4.1502D-08
3.8738D-08	-4.3116D-08	9.3254D-08	-1.4862D-07	4.1014D-08	-8.3902D-08
1.3847D-08	-2.7681D-08	3.9991D-08	-9.3886D-08	3.4476D-08	-4.1375D-08
-1.4583D-08	-3.4602D-10	-2.3653D-08	3.7907D-08	-1.5932D-08	1.1901D-08
8.6805D-10	3.9374D-08	-1.1017D-08	1.6273D-08	-1.3393D-09	4.2755D-08
-1.2908D-09	-6.2357D-08	2.3011D-08	-4.7813D-08	4.9992D-09	-7.0198D-08
4.2812D-09	2.0362D-10	-1.3001D-08	1.1756D-08	1.0221D-08	6.0572D-09
-1.7572D-08	3.0972D-08	-3.7821D-08	3.3836D-08	-2.2264D-08	4.0222D-08
4.3034D-08	1.9315D-08	1.7230D-09	1.0487D-08	2.9271D-08	2.2445D-08
-4.0213D-08	-4.4170D-08	3.3731D-09	-2.6507D-08	-2.3787D-08	-5.0010D-08
1.5531D-08	2.8025D-08	-2.3084D-08	1.4045D-08	7.2230D-09	3.4523D-08
1.9726D-08	3.2481D-10	-1.5318D-09	-2.3391D-10	2.2055D-08	8.6505D-10
3.5129D-09	2.2198D-08	-2.7044D-09	2.3605D-09	-3.7865D-10	2.2806D-08
6.8622D-09	-4.9118D-08	1.6163D-08	-3.1855D-08	1.0689D-08	-5.3601D-08
5.5417D-08	-5.8708D-09	1.2463D-08	-1.8588D-08	5.3102D-08	-9.8927D-09
5.1791D-09	-3.0509D-10	-4.5204D-09	7.7812D-09	-2.3454D-09	4.6893D-09
-1.2866D-07	4.8807D-09	-3.9929D-08	1.5345D-08	-8.1725D-08	-8.3261D-09
3.3336D-08	-8.7195D-08	1.3374D-08	-5.9439D-08	-8.2274D-09	-7.8060D-08
-1.7792D-09	9.4879D-08	-1.0927D-07	1.5958D-08	-3.0668D-08	1.3897D-07
-1.6898D-07	-3.5514D-09	1.0597D-07	1.0734D-07	-1.1404D-07	2.8898D-08
-3.4256D-08	1.0320D-10	-8.9410D-08	9.3867D-08	-1.2657D-07	7.9445D-08

-1.0999D-07	-6.9506D-08	9.3819D-08	-1.9165D-07	7.0082D-08	-2.1725D-07
-3.6757D-08	-1.7339D-10	-6.9670D-08	8.6384D-08	-1.0785D-07	6.6759D-08
1.2585D-07	-8.8893D-08	-2.3157D-08	1.5908D-08	-4.2754D-08	4.5079D-09
-2.6036D-07	6.3776D-09	1.8872D-08	-8.7750D-08	-2.1215D-08	-1.1693D-07
-3.0979D-09	-8.4592D-08	2.9074D-08	-8.2805D-08	8.9760D-09	-1.0387D-07
-3.4037D-03	-1.3232D-03	-6.8125D-03	2.7225D-03	7.9573D-03	-1.0019D-02
-1.3738D-02	2.1833D-03	-6.8260D-04	3.4016D-03	1.9539D-03	-3.6383D-03
5.3203D-03	2.7765D-04	7.7119D-03	-5.0690D-03	-6.5264D-04	1.9382D-03
6.2033D-03	2.8024D-03	5.7332D-03	-4.7344D-03	3.0982D-04	5.4808D-03
-1.3483D-02	-5.9676D-04	3.5024D-03	-7.3549D-03	-1.6573D-03	1.3290D-02
4.6248D-04	-2.4390D-02	-3.7433D-03	1.0005D-04	1.0974D-03	1.6870D-03
-5.8771D-02	3.2051D-03	-2.3400D-03	1.2980D-02	4.4037D-03	-6.3275D-03
1.1874D-03	-4.2478D-02	4.3922D-03	3.6934D-03	-1.3514D-03	4.4891D-03
-1.3940D-03	2.2366D-03	-5.1556D-02	6.7404D-03	-2.1160D-02	-1.4865D-03
1.2940D-02	5.1569D-03	7.0395D-03	-6.2756D-02	-4.2914D-03	-1.5132D-02
2.4963D-03	-2.4410D-03	-2.5911D-02	-5.6447D-03	-4.6183D-02	3.2909D-03
-5.3251D-03	9.5255D-04	-5.8582D-03	-1.5374D-02	6.6614D-03	-5.7670D-02
-3.4486D-03	-1.2897D-03	-9.6026D-04	-1.6385D-03	-1.3222D-03	-2.6430D-03
4.4466D-03	-6.1685D-04	-2.0484D-04	7.3904D-04	1.5731D-03	7.7651D-05
1.1324D-03	-3.1563D-03	1.8543D-04	2.3028D-03	-5.6600D-04	-1.0846D-03
5.3664D-05	3.1957D-03	2.7944D-04	-1.3511D-03	1.6222D-03	1.0443D-03
-7.2515D-04	2.5430D-03	-1.4728D-03	1.0947D-03	8.1988D-04	7.4084D-04
-6.2819D-04	-1.1850D-03	1.1464D-04	-5.2936D-04	-2.5914D-03	1.8151D-04
-2.7890D-19	2.7344D-19	5.8392D-19	-4.3305D-20	-5.5853D-19	3.1052D-19
-3.3627D-19	8.4395D-20	2.0456D-19	-5.9531D-20	4.3666D-19	-6.0693D-19
9.7898D-20	-3.2335D-20	-2.7104D-19	5.0253D-20	-2.9068D-19	2.6660D-19
2.0842D-19	3.8797D-19	-1.7444D-19	4.1587D-19	2.8890D-19	-2.0559D-19
2.1282D-19	7.4148D-20	6.9001D-19	-2.3955D-19	-4.8498D-19	-2.1996D-19
3.3425D-20	2.7147D-19	1.1251D-18	2.1362D-19	-2.1111D-19	-3.0760D-19
2.1811D-19	7.9935D-20	-4.4658D-19	1.2414D-19	1.2085D-19	-1.3833D-19
8.7938D-21	1.1227D-19	2.3198D-19	1.4777D-19	1.8777D-19	-2.1857D-19
-7.4195D-20	6.0914D-20	7.9370D-19	2.1818D-19	2.1211D-19	9.9544D-19
4.7331D-19	1.6270D-19	6.0965D-19	8.6366D-19	2.7983D-19	1.8021D-19
6.1229D-19	3.3115D-19	2.4527D-19	6.0011D-19	1.4911D-19	5.8613D-19
-7.7601D-19	4.6306D-19	-1.3055D-19	-5.3734D-21	8.8863D-19	-1.8021D-19
-1.5221D-19	1.4601D-19	-9.0231D-20	2.1596D-19	3.9465D-19	1.1788D-19
-1.2199D-20	1.0728D-19	4.2493D-19	7.6332D-20	6.1650D-20	-1.1374D-19
4.0486D-20	-6.6089D-20	-1.8092D-19	9.7184D-20	2.2593D-19	3.4707D-19
3.3554D-20	-1.1208D-19	-1.5092D-19	2.3701D-19	3.1096D-19	1.3700D-19
2.7459D-20	-6.4356D-20	4.3540D-19	-1.0249D-19	-7.9064D-20	5.5338D-20
2.7181D-19	-3.2246D-21	-2.2301D-20	-1.3165D-20	2.4289D-19	8.6993D-20
-5.1052D-08	1.1389D-07	-1.8196D-07	2.3399D-08	-2.2328D-07	1.6810D-07
2.6139D-07	-5.3588D-08	-2.8105D-08	2.1722D-08	2.4799D-08	1.0925D-07
1.2563D-07	3.2980D-08	-2.1515D-07	-1.9701D-08	4.8253D-08	1.1548D-08
6.9492D-08	7.9773D-08	-1.6545D-07	1.1110D-07	-2.1898D-08	1.5842D-07
1.1666D-06	-2.4691D-08	-2.7118D-08	-1.1417D-07	1.0878D-07	-1.6848D-07
-2.9603D-08	7.6745D-07	-6.1042D-08	-1.3333D-07	-2.1692D-08	-2.1380D-07
1.3677D-06	-5.8503D-08	-5.8002D-08	-2.6419D-07	1.3479D-07	-6.4739D-08
-5.8503D-08	9.5316D-07	-1.1990D-07	-5.6689D-08	-2.7840D-08	7.0703D-08
-5.8002D-08	-1.1990D-07	1.4437D-06	-2.4112D-07	8.4385D-07	-1.5701D-07
-2.6419D-07	-5.6689D-08	-2.4112D-07	1.7495D-06	-1.6222D-07	1.0910D-06

1.3479D-07	-2.7840D-08	8.4385D-07	-1.6222D-07	1.0075D-06	-1.5226D-07
-6.4739D-08	7.0703D-08	-1.5701D-07	1.0910D-06	-1.5226D-07	1.3172D-06
-1.2512D-09	1.2161D-07	-1.0806D-07	1.2870D-07	-1.9627D-08	1.4980D-07
5.7513D-09	1.2297D-07	-4.7958D-08	6.2471D-08	-1.8719D-08	1.2101D-07
-1.1755D-07	-4.5929D-08	-2.4007D-08	-3.4765D-08	-1.0489D-07	-6.1691D-08
-1.3984D-07	-5.7253D-08	-4.2605D-08	-9.0347D-10	-1.0945D-07	-5.6274D-08
1.3919D-07	-5.8064D-08	3.0929D-08	-7.2999D-08	9.8625D-08	-7.9155D-08
1.1404D-07	-4.4344D-08	5.8531D-08	-1.5903D-07	1.1963D-07	-9.3035D-08

Columns 13 thru 18

4.6770D-09	2.6947D-08	-7.7302D-08	-3.1448D-08	5.6746D-09	-1.8909D-08
-2.4504D-08	-8.9869D-09	8.3691D-09	-7.1292D-08	2.7876D-08	1.6360D-08
1.6739D-08	-4.0809D-09	1.3116D-09	9.3524D-08	-2.9748D-08	-1.3055D-08
5.3325D-09	3.6657D-08	-1.0856D-07	-5.5458D-08	2.1778D-08	-1.1880D-08
-1.3853D-08	1.3928D-08	-1.3039D-08	-5.5288D-08	5.5186D-08	1.3111D-08
-2.8655D-08	-2.8669D-08	2.6073D-08	7.9275D-09	7.9267D-09	2.6227D-08
1.8848D-08	1.8865D-08	-1.3402D-08	3.5322D-09	3.5261D-09	-1.3465D-08
-1.7450D-08	1.7645D-08	-2.1557D-08	-8.8680D-08	8.8492D-08	2.1510D-08
-2.7011D-08	-4.7594D-09	1.8911D-08	-5.6690D-09	3.1477D-08	7.7604D-08
-9.0161D-09	-2.4551D-08	1.6279D-08	2.7848D-08	-7.1194D-08	8.3991D-09
-4.0045D-09	1.6771D-08	-1.3003D-08	-2.9773D-08	9.3417D-08	1.2876D-09
-3.6660D-08	-5.4032D-09	1.1850D-08	-2.1845D-08	5.5484D-08	1.0877D-07
-3.4577D-08	-2.9330D-08	3.1745D-08	1.7931D-08	-1.6031D-08	2.0895D-08
4.3869D-08	-1.7426D-09	2.3650D-09	2.6417D-08	-2.4367D-08	-5.1863D-08
-7.8464D-08	-1.1946D-08	5.6672D-09	-2.4764D-08	2.5392D-08	7.5044D-08
-4.1267D-08	-2.2433D-08	2.5009D-08	7.5715D-09	-7.8663D-10	4.7501D-08
4.5919D-08	-4.6089D-08	2.1363D-08	2.3703D-08	-2.3583D-08	-2.1232D-08
6.2877D-08	6.2938D-08	-1.8828D-08	8.2016D-09	8.2146D-09	-1.8854D-08
-9.4713D-08	-9.4844D-08	3.3716D-08	-3.7535D-09	-3.7642D-09	3.3788D-08
5.3107D-08	-5.3192D-08	1.4851D-08	1.7283D-08	-1.7206D-08	-1.4818D-08
2.9106D-08	3.4542D-08	-2.0703D-08	1.6177D-08	-1.7920D-08	-3.1766D-08
-1.7305D-09	4.3945D-08	-5.1772D-08	-2.4434D-08	2.6299D-08	2.2963D-09
-1.1982D-08	-7.8615D-08	7.4918D-08	2.5388D-08	-2.4545D-08	5.8301D-09
2.2343D-08	4.1316D-08	-4.7343D-08	8.5798D-10	-7.6142D-09	-2.5170D-08
-3.9117D-09	3.8503D-09	1.2572D-09	-2.6197D-09	2.5313D-09	-1.2953D-09
3.2940D-09	-1.7898D-09	-1.1940D-09	3.3403D-10	5.6072D-09	-6.2454D-09
-2.3294D-08	-1.8434D-08	1.8053D-08	1.0826D-09	7.7335D-09	1.9126D-08
-9.3297D-09	7.9471D-09	-8.1654D-09	-1.9878D-08	2.2071D-08	1.7997D-08
4.4029D-09	-4.3286D-09	4.3682D-09	-4.3646D-09	4.3846D-09	-4.3661D-09
-2.0145D-09	1.5657D-09	2.3084D-08	2.3767D-08	-2.3718D-08	-2.2795D-08
-2.5730D-08	-2.8095D-08	1.4337D-08	1.2443D-08	1.5700D-08	1.1317D-08
9.0274D-08	9.0967D-08	-5.2302D-08	-3.8084D-08	-3.8299D-08	-5.2297D-08
7.7415D-09	-8.3674D-09	7.4239D-08	8.2989D-08	-8.2479D-08	-7.4385D-08
2.8881D-09	-2.5962D-09	2.6792D-08	1.9249D-08	-1.9137D-08	-2.6332D-08
-3.2255D-08	-2.1641D-08	7.7570D-09	1.9400D-08	7.8012D-09	1.8842D-08
2.7378D-09	-3.1987D-09	2.6399D-08	2.0010D-08	-2.0053D-08	-2.6317D-08
-2.0564D-08	-3.2381D-08	1.8537D-08	8.4943D-09	1.9506D-08	7.0786D-09
-6.7459D-09	7.1571D-09	1.6465D-08	2.9693D-08	-2.9478D-08	-1.7526D-08
-2.7124D-08	-2.6380D-08	1.2646D-08	1.3371D-08	1.3602D-08	1.3055D-08
-8.7884D-04	-9.5483D-04	-1.3605D-03	-1.5865D-03	-3.5529D-03	-3.7644D-03
-2.7420D-03	-1.4420D-03	4.7505D-04	1.6581D-03	2.4792D-03	3.6209D-03

-1.3469D-03	2.7027D-03	2.1903D-04	2.9428D-03	2.1091D-03	-3.1972D-03
3.1513D-04	-2.3250D-03	9.1709D-04	-3.9665D-04	-3.5917D-04	-7.3284D-04
4.2339D-03	-1.3903D-04	1.7508D-03	-1.4890D-03	-7.2804D-05	-6.4300D-04
-3.9415D-04	-1.3979D-03	8.3570D-04	-3.0369D-03	-4.0053D-03	-2.1637D-03
-9.3056D-03	7.8614D-04	6.1074D-04	2.0095D-03	-3.6488D-04	-1.1300D-03
-2.3416D-03	-2.2214D-03	-2.6430D-04	5.2552D-03	1.0223D-03	2.6931D-03
-7.4633D-04	-1.2798D-03	-5.5095D-05	5.0180D-03	6.6311D-04	3.4249D-03
2.3053D-03	1.5521D-04	1.3228D-03	1.4880D-03	3.4501D-03	2.1397D-04
-2.8132D-03	3.0153D-03	3.2296D-03	9.6085D-04	-2.2607D-03	-5.6203D-03
-5.0029D-03	-5.6354D-03	-1.2060D-03	3.0882D-03	-1.9481D-03	-8.7989D-04
-7.5612D-03	-1.4108D-03	2.3315D-04	-9.0445D-04	-7.0907D-05	4.9159D-04
8.7400D-04	-7.5542D-03	-6.0192D-04	-1.3132D-03	-4.4572D-04	-3.6294D-04
9.6637D-04	9.6218D-04	-8.5246D-03	-3.2641D-05	-1.0747D-03	-8.9905D-04
-4.6018D-05	1.1708D-03	1.9380D-04	-6.2634D-03	1.1858D-03	-1.3093D-03
-9.5988D-04	4.3606D-04	-3.3991D-04	4.7596D-04	-6.7387D-03	-4.2136D-05
3.2530D-06	-2.5460D-04	-7.5118D-04	-3.5036D-04	-1.2943D-03	-6.2734D-03
-2.4522D-19	-9.2184D-20	-1.1990D-19	-1.9683D-19	-1.0476D-19	-2.7017D-19
7.4479D-21	2.0726D-19	-3.0521D-19	9.5797D-20	1.4822D-19	7.8314D-20
-8.7228D-20	-2.6530D-19	-2.0288D-19	-2.1488D-19	-2.5225D-19	7.4360D-20
-5.5411D-20	2.7387D-19	-2.9603D-19	4.3457D-20	-2.0007D-19	1.7163D-19
-1.1668D-19	-1.0093D-19	-7.2792D-20	-1.4052D-19	9.6621D-20	1.9775D-19
6.8216D-20	-2.9333D-19	-7.3089D-20	2.9088D-19	1.2679D-19	-8.5818D-20
1.2785D-19	-2.0518D-19	1.2904D-22	-2.4625D-19	-3.4871D-20	1.3862D-19
3.2454D-20	-1.7711D-19	-1.5917D-19	7.6903D-20	-2.6239D-19	-2.6957D-20
2.8275D-20	-1.0888D-19	3.3655D-19	-3.2555D-20	1.8384D-19	3.7260D-19
2.2530D-19	-3.5764D-20	3.6856D-20	4.1968D-20	2.0660D-19	-8.4425D-20
1.4819D-19	-1.7146D-19	6.2783D-20	-7.4929D-20	-3.8232D-20	5.3500D-19
2.1720D-19	1.1726D-20	7.1369D-20	-1.4372D-19	-1.3453D-19	-8.2457D-20
3.3962D-20	8.8220D-20	-6.8486D-20	-9.4475[illegible]0	-1.5566D-19	2.9266D-20
4.3584D-21	1.6406D-19	-2.3923D-20	-1.444[illegible]9	4.5236D-20	-7.9329D-20
-1.0742D-20	8.2693D-20	1.4723D-19	1.15[illegible]	-5.4309D-20	1.3706D-19
1.7219D-19	-5.3050D-20	2.2536D-19	6.0[illegible]1	7.7303D-20	-3.5134D-20
-1.0412D-19	1.2523D-19	-8.6483D-20	-1.91[illegible]20	1.2263D-19	1.2273D-19
1.0865D-19	-9.0631D-20	1.1018D-19	-6.7711D-20	-1.9531D-20	2.7272D-19
4.7918D-08	1.0837D-07	-5.7417D-08	-3.0176D-08	4.2028D-08	2.2000D-08
6.3239D-08	1.2993D-07	-1.5770D-07	-7.2469D-08	-3.3734D-09	-3.6639D-08
1.9039D-08	2.0753D-08	-1.2013D-07	-9.5543D-08	1.0594D-07	1.0369D-07
1.2467D-07	1.5007D-07	-9.2041D-08	-7.6954D-08	-5.9629D-08	-6.6255D-08
-1.8104D-08	2.0795D-08	-7.8605D-08	-1.6708D-07	1.6549D-07	7.7790D-08
3.8177D-08	3.7371D-08	9.6881D-09	2.8551D-08	2.8871D-08	1.0079D-08
-1.2512D-09	5.7513D-09	-1.1755D-07	-1.3984D-07	1.3919D-07	1.1404D-07
1.2161D-07	1.2297D-07	-4.5929D-08	-5.7253D-08	-5.8064D-09	-4.4344D-08
-1.0806D-07	-4.7958D-08	-2.4007D-08	-4.2605D-08	3.0929D-08	5.8531D-08
1.2870D-07	6.2471D-08	-3.4765D-08	-9.0347D-10	-7.2999D-08	-1.5903D-07
-1.9627D-08	-1.8719D-08	-1.0489D-07	-1.0945D-07	9.8625D-08	1.1963D-07
1.4980D-07	1.2101D-07	-6.1691D-08	-5.6274D-08	-7.9155D-08	-9.3035D-08
1.9042D-07	7.9440D-08	-3.1571D-08	2.8401D-08	-3.1643D-08	-8.9256D-08
7.9440D-08	1.9079D-07	-8.9268D-08	-3.1838D-08	2.8348D-08	-3.1848D-08
-3.1571D-08	-8.9268D-08	1.9020D-07	7.9275D-08	-3.1656D-08	2.8334D-08
2.8401D-08	-3.1838D-08	7.9275D-08	1.9049D-07	-8.9248D-08	-3.1[illegible]4D-08

-3.1643D-08	2.8348D-08	-3.1656D-08	-8.9248D-08	1.9026D-07	7.9350D-08
-8.9256D-08	-3.1848D-08	2.8334D-08	-3.1864D-08	7.9350D-08	1.9070D-07

$\mathbf{D}_{sn}$

-1.7647D-09	-1.8419D-09	6.8720D-09	-2.2589D-08	1.3314D-08	5.9473D-09
-9.5796D-09	-4.5065D-09	1.1737D-08	-1.3076D-08	-9.3723D-10	1.2174D-08
7.0310D-09	7.6593D-09	-6.4718D-09	2.0969D-08	-1.3628D-08	-7.4026D-09
-8.8489D-09	-3.4035D-09	1.9356D-08	-3.6178D-08	1.6245D-08	2.0075D-08
-1.2861D-08	-2.3642D-09	2.0440D-08	-2.2223D-08	1.5587D-11	2.2317D-08
-2.3436D-10	6.4142D-09	-1.1712D-08	-1.1037D-08	-4.7295D-08	-1.0993D-08
3.0816D-10	5.7394D-10	1.9116D-08	1.9456D-08	3.3970D-08	1.9377D-08
-2.7435D-08	-8.3457D-09	3.3653D-08	-3.8446D-08	2.1215D-11	3.8585D-08
-1.9133D-09	6.8356D-09	2.1350D-08	-5.8151D-09	-1.3510D-08	2.2625D-08
9.5504D-09	4.6572D-09	-1.2220D-08	1.1986D-08	-9.5092D-10	-1.3055D-08
-7.1325D-09	3.0006D-09	1.8804D-08	-7.2182D-09	-1.3664D-08	2.0850D-08
-9.1025D-09	5.6324D-09	3.2753D-08	-1.9919D-08	-1.6454D-08	3.6237D-08
3.4591D-09	8.4132D-09	2.0517D-08	4.0933D-08	-1.6190D-09	2.0644D-08
4.4548D-09	-7.9211D-09	-1.1763D-08	2.3621D-08	2.4828D-08	-1.3736D-08
1.1313D-09	2.0485D-08	1.9543D-08	-1.6961D-08	-4.3099D-08	2.3567D-08
-4.1471D-10	1.1738D-08	3.3629D-08	2.9313D-08	-2.4899D-09	3.6021D-08
-3.5074D-09	-5.1578D-09	-6.7474D-09	7.6000D-09	-2.5570D-11	-7.4746D-09
1.2036D-10	-7.4246D-09	-1.1719D-08	-1.1237D-08	2.6121D-08	-1.1068D-08
-2.4676D-10	1.3168D-08	1.9931D-08	2.1095D-08	-4.1810D-08	2.0885D-08
-5.6986D-09	-2.5656D-09	4.1050D-09	-3.6252D-09	-6.4271D-11	3.6701D-09
3.7610D-09	-5.6107D-09	-3.9000D-08	-2.0629D-08	1.5351D-09	-4.0880D-08
-4.6054D-09	-3.8024D-09	2.2544D-08	-1.3817D-08	2.4753D-08	2.3608D-08
-1.1687D-09	6.2691D-09	-1.4438D-08	2.3723D-08	-4.2982D-08	-1.6938D-08
5.9051D-11	-2.9666D-09	-2.4858D-08	-3.6060D-08	2.3833D-09	-2.9296D-08
-3.6198D-09	-9.5915D-11	1.1326D-08	-1.1182D-08	-9.9954D-11	1.1204D-08
-1.6816D-09	-5.1730D-09	-6.5299D-09	-6.5486D-09	1.2924D-08	-6.3950D-09
-1.6077D-09	1.0308D-08	1.9404D-08	1.2670D-08	-3.1002D-08	1.9272D-08
-1.0274D-08	1.1411D-09	2.9238D-08	-2.4585D-08	-2.3641D-09	2.9821D-08
-2.9833D-09	-2.5392D-09	-2.0078D-11	2.8620D-11	5.0975D-11	3.3997D-11
2.9509D-08	5.5539D-09	-1.5347D-08	1.6820D-08	-6.7447D-10	-1.6156D-08
-1.1495D-08	9.3246D-09	8.9621D-09	9.3178D-09	-1.8956D-08	1.0089D-08
3.7912D-09	-2.4659D-08	-5.6734D-08	-6.0738D-08	1.1992D-07	-5.9243D-08
2.6936D-08	2.6281D-09	-9.8890D-08	1.0442D-07	3.1012D-10	-1.0428D-07
-9.3949D-09	-2.7515D-08	-1.5521D-08	1.5440D-08	-5.7070D-10	-1.5641D-08
4.9992D-08	6.2431D-08	8.7338D-09	1.0052D-08	-2.0252D-08	8.5258D-09
-7.7804D-09	-2.4143D-08	-1.5895D-08	1.7810D-08	4.2017D-10	-1.6258D-08
-5.0934D-08	-2.3097D-08	6.8365D-09	9.5433D-09	-1.7814D-08	8.5904D-09
8.0770D-08	4.9992D-08	-1.5247D-08	1.5407D-08	8.6655D-10	-1.7405D-08
3.0262D-09	2.0846D-08	9.8535D-09	9.3360D-09	-1.8310D-08	1.0682D-08
1.9006D-03	-1.7110D-04	4.9578D-03	-4.9705D-04	-6.4370D-04	3.7172D-03
-1.4757D-03	-7.7234D-06	-1.1563D-03	-9.2034D-04	9.0504D-04	-5.8544D-04
-1.9454D-03	-3.6444D-03	3.8890D-04	-5.2699D-04	2.9796D-04	2.0114D-03
-3.8413D-03	-2.4411D-03	-1.4248D-03	1.9139D-03	-3.7440D-04	-2.0364D-03
-6.5795D-04	1.0514D-03	1.2027D-03	-4.8274D-03	1.3180D-04	8.4675D-04
-1.1809D-04	6.5071D-04	-5.1828D-03	-1.9593D-03	6.3118D-03	-5.4213D-03
1.3652D-02	5.6516D-03	4.1966D-04	3.0179D-03	-3.6477D-04	2.8250D-04

4.9463D-04	3.4610D-03	-9.8676D-04	1.3541D-03	3.5699D-04	-5.1037D-04
1.5123D-03	-1.3232D-03	3.9411D-03	-5.1130D-03	3.9105D-04	4.0216D-03
1.2806D-03	2.0018D-03	1.8099D-03	-2.8154D-03	9.5903D-04	2.4583D-03
-1.1579D-03	-2.7232D-03	-3.1830D-03	-3.0679D-05	3.7058D-05	-3.3204D-03
5.0855D-03	8.9733D-03	-2.3345D-03	-1.5962D-03	-3.4181D-04	-2.7215D-03
1.0546D-04	3.9269D-04	6.7882D-04	8.6347D-04	-9.1656D-04	1.0339D-03
-1.3491D-04	-1.3852D-04	1.5526D-03	1.3891D-03	-9.0823D-04	1.6538D-03
8.4216D-04	-1.0463D-03	4.5673D-04	2.1398D-05	-5.9269D-04	5.4162D-04
-2.3896D-03	1.3424D-03	3.8394D-04	-2.8713D-03	3.3757D-03	7.6929D-04
2.1519D-03	1.9130D-03	-7.3064D-04	2.6692D-03	3.3717D-03	-1.0138D-03
-5.7290D-04	-1.5143D-03	-1.6225D-03	7.6074D-04	-5.4184D-04	-1.8704D-03
-9.6962D-20	2.4673D-20	-1.1586D-19	1.3246D-19	4.4847D-19	1.3439D-19
-8.7681D-21	1.3873D-20	9.2239D-20	-1.3566D-20	-1.5117D-19	-1.5213D-19
-1.2446D-19	2.3724D-20	-6.5748D-20	-2.4624D-20	1.4278D-19	2.7579D-19
-4.5171D-20	-4.6157D-21	-1.6164D-20	-1.7144D-19	-1.0111D-19	-1.6060D-19
-1.4247D-20	6.2204D-22	-1.7328D-20	5.7268D-20	5.0701D-20	1.0429D-19
-3.5532D-21	2.0254D-20	4.4320D-19	2.8814D-19	2.0735D-19	6.8940D-20
-1.9392D-20	5.9822D-20	4.3784D-20	-9.9003D-20	-9.2608D-20	1.7121D-19
-4.4495D-20	1.5870D-20	8.4978D-20	1.1418D-19	1.6510D-19	-8.1883D-20
-6.8242D-20	-1.0884D-19	-4.2566D-19	2.6569D-19	-2.1446D-19	-1.5990D-19
-1.5405D-20	-2.0713D-20	-2.0013D-19	1.5540D-19	-6.4906D-20	-2.8787D-19
-1.6283D-19	-9.4037D-20	-1.1680D-19	3.0759D-20	-1.6149D-19	7.1583D-20
7.5763D-20	-3.0245D-20	-1.7632D-19	-5.4399D-20	-2.2014D-20	-1.6418D-19
-3.6120D-20	-3.8185D-20	4.4406D-20	-4.0006D-20	3.7350D-20	-2.8481D-20
4.8034D-20	2.4245D-21	2.0054D-20	-3.2052D-21	8.6422D-20	-6.5364D-20
-2.1565D-20	-5.7612D-20	-1.2372D-20	3.4962D-20	-3.0431D-20	-2.6878D-20
4.4459D-20	-3.5317D-20	4.4905D-20	4.0760D-20	-2.9267D-20	-1.4227D-20
-1.9292D-20	2.2623D-21	3.2875D-20	1.6451D-20	2.2130D-20	1.2806D-19
7.6200D-21	-3.0607D-20	1.8013D-22	-2.4913D-20	-3.3278D-20	1.5161D-19
2.2129D-08	2.8640D-08	-2.1637D-07	-7.1621D-08	-9.6786D-09	-2.0839D-07
7.6322D-08	1.8656D-08	1.2352D-07	-3.0300D-08	7.8294D-08	1.1715D-07
-1.2981D-08	5.3890D-08	2.4204D-08	-1.1633D-07	-7.3878D-09	1.6447D-08
9.7799D-08	4.9187D-09	-1.7917D-08	-6.1500D-08	1.3612D-07	-1.8030D-08
-2.4915D-07	-1.0860D-07	4.7142D-08	-6.2954D-08	2.7238D-09	6.2105D-08
-2.8284D-09	-2.1103D-08	-5.0003D-08	-4.7375D-08	-2.3921D-07	-4.6871D-08
-2.6036D-07	-1.0999D-07	9.7697D-08	-1.1431D-07	7.7393D-09	1.1161D-07
6.3776D-09	-6.9506D-08	-6.2984D-08	-7.4228D-08	2.3433D-08	-6.9589D-08
1.8872D-08	9.3819D-08	7.2586D-08	2.0553D-07	9.7147D-09	7.2446D-08
-8.7750D-08	-1.9165D-07	-1.6528D-08	1.2199D-07	7.7216D-08	-3.0794D-08
-2.1215D-08	7.0082D-08	1.1471D-07	-2.4126D-08	4.6894D-09	1.2156D-07
-1.1693D-07	-2.1725D-07	-5.5860D-08	-4.9371D-09	1.3177D-07	-6.1427D-08
-6.7459D-09	-3.2255D-08	-6.3934D-08	-5.3855D-08	5.5193D-08	-7.1545D-08
7.1571D-09	-2.1641D-08	-5.1703D-08	-7.2041D-08	5.5186D-08	-5.3726D-08
1.6465D-08	7.7570D-09	-5.1739D-08	5.5169D-08	-7.1491D-08	-5.3830D-08
2.9693D-08	1.9400D-08	-6.4114D-08	5.5283D-08	-5.3644D-08	-7.1971D-08
-2.9478D-08	7.8012D-09	4.5351D-08	-7.1467D-08	-5.3749D-08	5.5255D-08
-1.7526D-08	1.8842D-08	4.5707D-08	-5.3631D-08	-7.1999D-08	5.5182D-08

14-State Internally Balanced Reduced Order Model

$\mathbf{F}_r$ =

Columns 1 thru 6

-3.3570D-01	1.6784D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.6784D+02	-3.3570D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.6042D-01	1.8021D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.8021D+02	-3.6042D-01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.6046D-01	1.8023D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.8023D+02	-3.6046D-01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-3.7981D-01	1.8962D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.8962D+02	-3.7981D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-5.0629D-01	2.0816D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-2.0816D+02	-5.0629D-01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-5.1203D-01	2.0825D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-2.0825D+02	-5.1203D-01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 13 thru 14

0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00
-9.0750D-01	4.5316D+02
-4.5316D+02	-9.0750D-01

B_3 =

Columns 1 thru 6

-2.7162D-01	-4.1078D-01	-1.9513D-01	-2.6541D-01	4.9103D-01	-2.9360D-02
7.9835D-01	1.2078D+00	5.7037D-01	7.7385D-01	-1.4439D+00	8.6161D-02
-7.7495D-03	4.1982D-01	-3.7688D-02	3.2179D-01	6.9586D-01	-5.9035D-02
2.6203D-02	-1.1799D+00	1.1753D-01	-9.0811D-01	-1.9495D+00	1.6655D-01
4.7874D-01	4.2999D-01	3.7741D-01	2.9034D-01	-1.4332D-02	-2.9288D-01
-1.3041D+00	-1.1651D+00	-1.0315D+00	-7.8204D-01	3.9891D-02	8.0263D-01
-6.0959D-01	4.1650D-01	-4.7642D-01	2.9278D-01	-5.3513D-02	-7.3444D-01
5.7209D-03	-4.0125D-03	5.7774D-03	-3.3648D-03	5.0574D-04	7.0481D-03
6.1040D-02	3.1541D-02	5.8510D-02	6.4092D-03	5.1765D-02	1.5855D-01
5.2715D-01	-6.1780D-01	4.5708D-01	-4.5414D-01	1.2540D-02	-9.5337D-01
-1.4638D-01	1.1666D-01	-1.1576D-01	9.1379D-02	-3.2706D-02	1.2508D-01
6.5246D-01	-1.7677D-01	5.7130D-01	-1.5898D-01	3.2375D-01	3.6184D-01
-4.8334D-03	-6.9510D-03	8.1541D-03	1.2561D-02	8.3237D-03	-7.2556D-04
5.3818D-01	8.5128D-01	-5.0966D-01	-7.9929D-01	-9.8222D-01	4.2508D-02

Columns 7 thru 12

3.2613D-01	-3.5263D-02	-2.2038D-01	4.3961D-01	-1.3351D-01	3.0054D-01
-9.5168D-01	1.0425D-01	6.4849D-01	-1.2926D+00	3.8869D-01	-8.7756D-01
5.0067D-01	-5.5774D-02	-7.2367D-02	-4.2918D-01	-9.6282D-02	-3.3397D-01
-1.4002D+00	1.5725D-01	2.0963D-01	1.2050D+00	2.8383D-01	9.4125D-01
-1.1105D-02	-2.6321D-01	-3.9417D-01	4.9648D-01	-2.9634D-01	3.5075D-01
3.1260D-02	7.3091D-01	1.0730D+00	-1.3476D+00	8.1020D-01	-9.4751D-01
-1.2052D-02	-5.5809D-01	6.6382D-01	3.1871D-01	4.9133D-01	2.6641D-01
-5.8082D-06	6.6602D-03	-6.6951D-03	-3.1109D-03	-5.9840D-03	-3.4658D-03
3.5128D-02	1.1673D-01	1.5132D-01	9.6332D-02	1.2808D-01	7.4350D-02
4.7627D-02	-8.0846D-01	-8.4832D-03	-3.3325D-01	-4.3508D-02	-2.6982D-01
-1.8113D-02	1.1150D-01	-7.3216D-02	2.6629D-02	-4.0576D-02	2.1286D-02
2.1845D-01	2.7190D-01	9.2860D-01	3.6743D-01	7.4586D-01	3.4775D-01
-1.4775D-02	9.1227D-04	-3.6175D-03	7.4949D-03	6.6987D-03	-1.3124D-02
9.2252D-01	-4.3065D-02	4.6327D-01	-8.7963D-01	-4.3180D-01	8.2939D-01

Columns 12 thru 18

3.9897D-02	-4.0439D-02	4.0057D-02	-4.0624D-02	4.0042D-02	-4.0567D-02
-1.1675D-01	1.1764D-01	-1.1700D-01	1.1839D-01	-1.1706D-01	1.1825D-01
3.0269D-02	-3.2998D-02	3.6817D-02	6.8535D-02	-6.6448D-02	-3.5048D-02
-8.7091D-02	9.5547D-02	-1.0752D-01	-1.9909D-01	1.9293D-01	1.0232D-01
-6.1321D-02	-6.1508D-02	5.7389D-02	1.1529D-03	3.9685D-03	6.0315D-02
1.7285D-01	1.7331D-01	-1.6099D-01	-3.7453D-03	-1.1965D-02	-1.6941D-01
-7.6592D-02	-6.3165D-02	-7.6089D-02	-6.1518D-02	-7.7302D-02	-6.2854D-02
-9.6971D-04	-1.0833D-03	-1.0017D-03	1.0776D-03	-9.7268D-04	-1.1306D-03
8.6836D-03	-2.2530D-02	5.6242D-03	1.0415D-02	-2.2138D-02	3.7868D-03
8.5020D-02	3.9581D-02	-1.0877D-01	7.6415D-02	2.9228D-02	-1.1012D-01
-1.3029D-02	-2.7633D-03	1.9417D-02	-1.2451D-02	-8.9600D-04	2.0903D-02
7.8953D-02	-1.1081D-01	2.6449D-02	8.3292D-02	-1.1570D-01	1.4967D-02
-3.6660D-04	6.8200D-04	-5.9658D-04	8.9437D-04	-4.5073D-04	7.7311D-04
1.6905D-01	-1.6549D-01	1.6649D-01	-1.5606D-01	1.6656D-01	-1.6106D-01

$G_s =$

Columns 1 thru 6

-1.5059D-01	-1.2838D-01	-1.5721D-03	3.6804D-04	5.2143D-04	5.8677D-04
4.5470D-01	3.8776D-01	5.1308D-03	-5.3710D-04	-1.0984D-03	-1.2824D-03
-3.4685D-02	1.0017D-02	-2.9174D-02	2.3583D-02	7.7772D-03	-3.1532D-02
9.6336D-02	-2.8351D-02	8.6413D-02	-7.0818D-02	-2.1952D-02	9.3245D-02
-6.7050D-03	-3.1704D-02	8.0480D-03	2.3282D-02	-3.2870D-02	9.3868D-03
1.8450D-02	8.5308D-02	-2.4219D-02	-6.6114D-02	9.4737D-02	-2.8025D-02
1.1650D-02	7.9679D-03	3.6654D-02	2.3249D-02	2.3491D-02	2.3542D-02
-2.3418D-04	-1.8531D-04	1.0164D-03	9.9334D-04	1.0358D-03	1.0751D-03
-1.9624D-02	-1.1967D-02	-7.9451D-04	2.5735D-02	-2.2267D-02	-1.9940D-03
-2.1247D-02	1.1400D-01	-9.6980D-02	-2.7811D-02	1.2670D-01	-9.9216D-02
1.0666D-02	-1.7747D-02	2.4149D-02	-9.4384D-03	-1.7019D-02	2.5251D-02
-1.2553D-01	-2.4100D-02	-7.7761D-02	1.3210D-01	-4.3602D-02	-8.6375D-02
9.2501D-04	7.0920D-04	2.0424D-04	-6.6269D-05	-2.5781D-05	-1.0241D-04
-2.4067D-01	-1.9934D-01	-5.1203D-04	3.9638D-03	8.3271D-03	7.5720D-03

$C_s =$

6.9789D-07	9.4676D-08	-5.1716D-06	-1.8395D-06	1.4021D-07	5.8942D-08
7.5304D-08	2.6090D-08	-4.7561D-08	-1.8918D-08	1.0903D-06	4.1026D-07
-4.0424D-08	-1.1022D-08	-6.6159D-07	-2.4771D-07	2.7882D-06	1.2364D-06
6.9789D-07	9.4676D-08	-5.1716D-06	-1.8395D-06	1.4021D-07	5.8942D-08
7.5304D-08	2.6090D-08	-4.7561D-08	-1.8918D-08	1.0903D-06	4.1026D-07
-4.0424D-08	-1.1022D-08	-6.6159D-07	-2.4771D-07	2.7882D-06	1.2364D-06
-4.1228D-07	-7.5498D-08	-4.3218D-07	-1.4649D-07	2.7700D-06	1.0226D-06
5.6594D-07	6.9712D-08	2.5935D-06	9.2593D-07	-3.6320D-06	-1.3302D-06
-2.9080D-08	1.7226D-08	-2.0800D-06	-9.1740D-07	-1.9613D-06	-8.3773D-07
-4.1228D-07	-7.5498D-08	-4.3218D-07	-1.4649D-07	2.7700D-06	1.0226D-06
5.6594D-07	6.9712D-08	2.5935D-06	9.2593D-07	-3.6320D-06	-1.3302D-06
-2.9080D-08	1.7226D-08	-2.0800D-06	-9.1740D-07	-1.9613D-06	-8.3773D-07
-2.8022D-07	-2.8727D-08	-5.1565D-07	-1.7929D-07	-2.6315D-06	-9.6933D-07
-6.3235D-07	-1.0175D-07	-2.8299D-06	-1.0170D-06	-3.5529D-06	-1.3036D-06
-4.6966D-08	-1.2900D-08	2.7590D-06	1.1656D-06	-8.0999D-07	-3.9053D-07
-2.8022D-07	-2.8727D-08	-5.1565D-07	-1.7929D-07	-2.6315D-06	-9.6933D-07
-6.3235D-07	-1.0175D-07	-2.8299D-06	-1.0170D-06	-3.5529D-06	-1.3036D-06
-4.6966D-08	-1.2900D-08	2.7590D-06	1.1656D-06	-8.0999D-07	-3.9053D-07
1.7301D-06	5.4911D-07	2.9936D-06	1.0708D-06	2.7726D-06	1.0565D-06
-3.1934D-06	-9.9158D-07	2.8387D-06	1.0606D-06	-3.7508D-07	-1.9169D-07
2.4574D-06	8.0444D-07	-3.3129D-06	-1.2418D-06	2.3599D-07	1.2158D-07
1.3015D-06	4.4324D-07	3.7030D-06	1.3527D-06	3.1884D-06	1.2177D-06
-2.4680D-06	-8.7067D-07	4.7486D-07	2.2873D-07	1.5448D-08	-9.6604D-10
-1.9954D-07	-6.9216D-08	3.8460D-09	5.5934D-09	-2.6277D-06	-1.0463D-06
2.8961D-07	9.8164D-08	1.9690D-08	1.3877D-09	3.0775D-06	1.1861D-06
-6.3315D-06	-2.0764D-06	-5.1119D-07	-7.3266D-08	5.6287D-09	-6.6220D-09
1.8914D-06	5.9808D-07	2.8799D-06	1.0279D-06	-2.8636D-06	-1.1055D-06
3.0984D-06	9.6963D-07	-2.8239D-06	-1.0444D-06	-2.8927D-07	-1.5455D-07
-2.3574D-06	-7.8430D-07	3.2645D-06	1.2117D-06	1.1095D-07	7.2462D-08
1.4637D-06	4.9143D-07	3.5470D-06	1.2945D-06	-3.3571D-06	-1.2992D-06
1.4027D-06	5.0306D-07	-1.8544D-06	-7.0776D-07	-1.3281D-06	-5.5426D-07

-2.0212D-06	-7.1717D-07	-1.3623D-06	-5.3803D-07	-3.0793D-07	-8.7052D-08
5.3221D-06	1.7457D-06	1.1364D-06	4.6903D-07	1.1421D-06	3.5097D-07
3.4121D-06	1.1351D-06	-2.4556D-06	-8.8894D-07	-1.0728D-06	-4.7153D-07
-3.6255D-06	-1.1267D-06	-1.9762D-06	-7.8068D-07	2.5710D-08	1.4259D-09
8.6384D-08	3.5598D-08	6.4228D-08	3.1318D-08	4.5598D-06	1.7041D-06
-8.6788D-08	-3.6907D-08	-1.1276D-07	-4.9997D-08	-5.5072D-06	-2.0882D-06
-2.7719D-06	-9.0990D-07	-2.0807D-06	-8.0473D-07	2.3453D-08	1.3380D-09
1.0621D-06	3.8609D-07	-1.8576D-06	-7.0466D-07	1.3364D-06	5.4460D-07
2.2184D-06	8.0010D-07	1.3320D-06	5.3899D-07	-2.9386D-07	-8.6489D-08
-5.6085D-06	-1.8625D-06	-1.0945D-06	-4.6728D-07	1.1585D-06	3.5714D-07
2.9164D-06	9.6543D-07	-2.4206D-06	-8.7293D-07	1.1238D-06	4.7737D-07
1.5915D-09	8.8188D-09	2.5712D-06	8.7095D-07	-3.2290D-08	-1.8558D-08
-7.7962D-07	-2.3006D-07	2.2489D-08	1.3945D-08	2.5583D-06	8.9302D-07
-6.4296D-09	-1.0215D-08	8.7806D-07	3.0536D-07	-3.2176D-06	-1.1659D-06
5.2785D-08	2.8090D-08	3.4895D-06	1.2224D-06	-7.4301D-07	-2.8241D-07
-1.3166D-06	-3.9962D-07	-2.3713D-09	-1.4620D-09	3.0092D-09	2.1600D-10
1.9973D-06	8.9265D-07	2.2405D-06	8.1371D-07	3.7092D-07	1.4796D-07
-3.3064D-06	-1.5310D-06	-3.9863D-07	-1.5011D-07	2.2441D-06	8.5461D-07
3.9238D-07	1.1796D-07	-6.3611D-07	-2.4477D-07	2.9134D-06	1.3595D-06
3.3005D-07	1.3395D-07	-2.9462D-06	-1.3328D-06	-7.2266D-07	-2.8962D-07
-7.8128D-06	-3.5778D-06	2.3343D-06	8.6579D-07	4.9331D-09	3.7680D-08
1.2941D-05	5.9442D-06	-8.4811D-07	-3.3924D-07	2.5962D-06	9.4380D-07
-7.2336D-06	-3.3699D-06	2.1514D-06	7.9994D-07	7.4607D-07	3.0779D-07
-1.3281D-05	-6.0976D-06	-1.2978D-07	-3.7444D-08	2.7538D-06	1.0655D-06
1.5182D-05	6.9526D-06	2.9337D-06	1.0358D-06	5.6783D-07	1.8918D-07
3.3686D-07	1.0506D-07	-3.2935D-07	-1.3116D-07	2.0280D-06	7.6854D-07
2.7829D-05	9.0613D-06	6.8674D-07	4.7327D-07	-3.9708D-05	-1.4354D-05
4.2119D-05	1.3655D-05	-3.5956D-05	-1.2614D-05	-3.5603D-05	-1.2606D-05
2.0175D-05	5.6630D-06	3.3447D-06	1.7221D-06	-3.1388D-05	-1.1367D-05
2.7520D-05	7.2775D-06	-2.7635D-05	-9.7694D-06	-2.4034D-05	-8.1601D-06
-5.0343D-05	-1.6343D-05	-5.9476D-05	-2.0623D-05	1.1771D-06	4.4231D-07
2.9998D-06	9.9506D-07	5.0810D-06	1.7867D-06	2.4341D-05	9.0484D-06
-3.3766D-05	-9.1558D-06	-4.2800D-05	-1.4616D-05	9.2252D-07	3.4854D-07
3.6222D-06	1.2151D-06	4.8052D-06	1.6651D-06	2.2006D-05	8.5569D-06
2.2628D-05	7.2861D-06	6.2975D-06	2.4646D-06	3.2669D-05	1.1832D-05
-4.5058D-05	-1.4658D-05	3.6700D-05	1.2837D-05	-4.1099D-05	-1.4652D-05
1.3887D-05	3.4791D-06	8.4239D-06	3.5316D-06	2.4618D-05	9.0366D-06
-3.1089D-05	-8.5713D-06	2.8650D-05	1.0038D-05	-2.9002D-05	-1.0073D-05
-4.0742D-06	-1.3202D-06	-2.6073D-06	-1.0161D-06	5.2092D-06	1.9819D-06
4.0968D-06	1.3607D-06	2.8534D-06	1.1468D-06	5.2193D-06	2.0067D-06
-4.0630D-06	-1.3795D-06	-3.2543D-06	-1.1769D-06	-4.8384D-06	-1.8882D-06
4.1369D-06	1.3281D-06	-5.9863D-06	-2.2720D-06	-1.4157D-07	2.1291D-08
-4.0759D-06	-1.3495D-06	5.8096D-06	2.1762D-06	-3.7354D-07	-9.5076D-08
4.1135D-06	1.3768D-06	3.0943D-06	1.1144D-06	-5.0733D-06	-2.0247D-06
-3.7950D-05	1.0951D-04	3.2991D-04	-9.3244D-04	-9.5666D-06	2.5659D-05
-4.4611D-06	1.2601D-05	3.0716D-06	-8.7015D-06	-7.2433D-05	1.9712D-04
1.3274D-06	-7.0362D-06	4.2716D-05	-1.1996D-04	-1.9375D-04	5.1379D-04
-3.7950D-05	1.0951D-04	3.2991D-04	-9.3244D-04	-9.5666D-06	2.5659D-05
-4.4611D-06	1.2601D-05	3.0716D-06	-8.7015D-06	-7.2433D-05	1.9712D-04
1.3274D-06	-7.0362D-06	4.2716D-05	-1.1996D-04	-1.9375D-04	5.1379D-04
2.2917D-05	-6.5672D-05	2.7009D-05	-7.7591D-05	-1.8261D-04	4.9983D-04

-3.0593D-05	8.8467D-05	-1.6564D-04	4.6781D-04	2.3895D-04	-6.5479D-04
2.5535D-07	-3.7151D-06	1.4111D-04	-3.8405D-04	1.3461D-04	-3.5977D-04
2.2917D-05	-6.5672D-05	2.7009D-05	-7.7591D-05	-1.8261D-04	4.9983D-04
-3.0593D-05	8.8467D-05	-1.6564D-04	4.6781D-04	2.3895D-04	-6.5479D-04
2.5535D-07	-3.7151D-06	1.4111D-04	-3.8405D-04	1.3461D-04	-3.5977D-04
1.5105D-05	-4.3502D-05	3.2630D-05	-9.2756D-05	1.7349D-04	-4.7470D-04
3.4951D-05	-9.9987D-05	1.8102D-04	-5.1074D-04	2.3375D-04	-6.4068D-04
1.7339D-06	-8.0626D-06	-1.8438D-04	5.0675D-04	5.7648D-05	-1.5096D-04
1.5105D-05	-4.3502D-05	3.2630D-05	-9.2756D-05	1.7349D-04	-4.7470D-04
3.4951D-05	-9.9987D-05	1.8102D-04	-5.1074D-04	2.3375D-04	-6.4068D-04
1.7339D-06	-8.0626D-06	-1.8438D-04	5.0675D-04	5.7648D-05	-1.5096D-04
-9.7688D-05	2.8850D-04	-1.9437D-04	5.3880D-04	-1.8652D-04	5.0119D-04
1.7881D-04	-5.3166D-04	-1.8545D-04	5.1360D-04	2.6720D-05	-7.0708D-05
-1.3605D-04	4.1205D-04	2.1719D-04	-5.9940D-04	-1.6903D-05	4.4612D-05
-7.3060D-05	2.1893D-04	-2.4197D-04	6.6780D-04	-2.1525D-04	5.7627D-04
1.3665D-04	-4.1746D-04	-3.9104D-05	8.6200D-05	-8.1594D-07	2.4254D-06
1.1637D-05	-3.3454D-05	-3.2456D-07	9.5261D-07	1.7648D-04	-4.7824D-04
-1.6600D-05	4.8531D-05	-1.1544D-06	3.2101D-06	-2.0398D-04	5.5847D-04
3.5522D-04	-1.0603D-03	2.0881D-05	-8.9473D-05	-1.9709D-07	5.1011D-07
-1.0596D-04	3.1555D-04	-1.8691D-04	5.1821D-04	1.9328D-04	-5.1835D-04
-1.7401D-04	5.1616D-04	1.8437D-04	-5.1032D-04	2.0792D-05	-5.4965D-05
1.3127D-04	-3.9583D-04	-2.1393D-04	5.8994D-04	-8.3966D-06	2.1953D-05
-8.1197D-05	2.4614D-04	-2.3171D-04	6.3958D-04	2.2732D-04	-6.0762D-04
-7.8150D-05	2.3762D-04	1.1878D-04	-3.3752D-04	9.2941D-05	-2.4196D-04
1.1190D-04	-3.4214D-04	9.1855D-05	-2.4737D-04	1.4355D-05	-5.6143D-05
-2.9867D-04	8.9127D-04	-7.7823D-05	2.0727D-04	-6.6517D-05	2.0476D-04
-1.9190D-04	5.7222D-04	1.5479D-04	-4.4465D-04	7.6467D-05	-1.9654D-04
2.0336D-04	-6.0355D-04	1.3025D-04	-3.6010D-04	-1.4392D-06	4.1985D-06
-4.8289D-06	1.4914D-05	-4.6058D-06	1.1932D-05	-3.0611D-04	8.2202D-04
4.8727D-06	-1.5042D-05	7.8516D-06	-2.0721D-05	3.7170D-04	-9.9412D-04
1.5386D-04	-4.6480D-04	1.3705D-04	-3.7808D-04	-1.3706D-06	3.8115D-06
-5.8853D-05	1.8033D-04	1.1860D-04	-3.3791D-04	-9.3011D-05	2.4279D-04
-1.2389D-04	3.7593D-04	-9.0310D-05	2.4248D-04	1.3632D-05	-5.3829D-05
3.1597D-04	-9.4016D-04	7.5555D-05	-2.0035D-04	-6.7634D-05	2.0770D-04
-1.6400D-04	4.8883D-04	1.5219D-04	-4.3819D-04	-7.9427D-05	2.0503D-04
-4.4118D-07	6.5606D-07	-1.5823D-04	4.6269D-04	2.0870D-06	-6.2813D-06
4.3497D-05	-1.2913D-04	-1.4420D-06	4.4071D-06	-1.6243D-04	4.6032D-04
8.8082D-07	-1.3948D-06	-5.4666D-05	1.5839D-04	2.0719D-04	-5.8076D-04
-3.4148D-06	9.3405D-06	-2.1700D-04	6.2978D-04	4.8098D-05	-1.3494D-04
7.4132D-05	-2.1854D-04	1.5314D-07	-4.6920D-07	-1.6516D-07	4.9557D-07
-1.1647D-04	3.4667D-04	-1.4117D-04	4.0613D-04	-2.4871D-05	6.7495D-05
1.9443D-04	-5.7658D-04	2.5789D-05	-7.2227D-05	-1.4658D-04	4.0765D-04
-2.2217D-05	6.4919D-05	4.1056D-05	-1.1566D-04	-2.0476D-04	5.4080D-04
-1.9573D-05	5.6507D-05	2.0037D-04	-5.4602D-04	4.8580D-05	-1.3156D-04
4.5837D-04	-1.3604D-03	-1.4779D-04	4.2409D-04	-1.3694D-06	2.8753D-06
-7.5821D-04	2.2546D-03	5.5400D-05	-1.5493D-04	-1.6878D-04	4.6884D-04
4.2490D-04	-1.2627D-03	-1.3620D-04	3.9103D-04	-5.0590D-05	1.3625D-04
7.7907D-04	-2.3134D-03	7.8060D-06	-2.2890D-05	-1.8129D-04	5.0074D-04
-8.8945D-04	2.6438D-03	-1.8534D-04	5.2950D-04	-3.6660D-05	1.0138D-04
-1.8855D-05	5.6055D-05	2.1486D-05	-6.0078D-05	-1.3206D-04	3.6833D-04
-1.5922D-03	4.6461D-03	-6.0749D-05	1.3342D-04	2.6263D-03	-7.1421D-03

-2.4116D-03	7.0278D-03	2.3066D-03	-6.4677D-03	2.3330D-03	-6.3933D-03
-1.1499D-03	3.3171D-03	-2.4281D-04	6.2871D-04	2.0847D-03	-5.6437D-03
-1.5660D-03	4.4998D-03	1.7819D-03	-4.9723D-03	1.5672D-03	-4.2943D-03
2.8806D-03	-8.4020D-03	3.7953D-03	-1.0689D-02	-8.0783D-05	2.1178D-04
-1.6999D-04	5.0235D-04	-3.2662D-04	9.1417D-04	-1.6282D-03	4.3887D-03
1.9241D-03	-5.5339D-03	2.7330D-03	-7.6758D-03	-6.2387D-05	1.6642D-04
-2.0666D-04	6.0681D-04	-3.0871D-04	8.6305D-04	-1.4911D-03	3.9868D-03
-1.2946D-03	3.7730D-03	-4.2359D-04	1.1430D-03	-2.1610D-03	5.8774D-03
2.5785D-03	-7.5218D-03	-2.3508D-03	6.6001D-03	2.7017D-03	-7.3840D-03
-7.8774D-04	2.2603D-03	-5.7117D-04	1.5432D-03	-1.6395D-03	4.4329D-03
1.7729D-03	-5.1029D-03	-1.8442D-03	5.1504D-03	1.9024D-03	-5.1932D-03
2.2792D-04	-6.8150D-04	1.7195D-04	-4.7424D-04	-3.5615D-04	9.3878D-04
-2.2985D-04	6.8709D-04	-1.8959D-04	5.2066D-04	-3.5732D-04	9.4179D-04
2.2976D-04	-6.8262D-04	2.1610D-04	-5.8444D-04	3.3029D-04	-8.7582D-04
-2.2984D-04	6.9179D-04	3.9709D-04	-1.0829D-03	9.3375D-06	-2.0115D-05
2.2904D-04	-6.8323D-04	-3.8521D-04	1.0493D-03	2.5821D-05	-6.3550D-05
-2.3036D-04	6.9075D-04	-2.0533D-04	5.5545D-04	3.4762D-04	-9.2080D-04
-1.8530D-02	-5.9439D-03	1.6785D-01	6.0021D-02	-4.6164D-03	-1.7442D-03
-2.1122D-03	-7.5748D-04	1.5640D-03	5.6241D-04	-3.5492D-02	-1.3159D-02
1.1853D-03	2.1023D-04	2.1578D-02	7.7700D-03	-9.2237D-02	-3.6091D-02
-1.8530D-02	-5.9439D-03	1.6785D-01	6.0021D-02	-4.6164D-03	-1.7442D-03
-2.1122D-03	-7.5748D-04	1.5640D-03	5.6241D-04	-3.5492D-02	-1.3159D-02
1.1853D-03	2.1023D-04	2.1578D-02	7.7700D-03	-9.2237D-02	-3.6091D-02
1.1092D-02	3.6456D-03	1.3963D-02	4.9242D-03	-8.9981D-02	-3.3217D-02
-1.4976D-02	-4.7685D-03	-8.4210D-02	-3.0127D-02	1.1787D-01	4.3470D-02
6.2812D-04	1.8362D-05	6.8911D-02	2.6435D-02	6.4636D-02	2.4913D-02
1.1092D-02	3.6456D-03	1.3963D-02	4.9242D-03	-8.9981D-02	-3.3217D-02
-1.4976D-02	-4.7685D-03	-8.4210D-02	-3.0127D-02	1.1787D-01	4.3470D-02
6.2812D-04	1.8362D-05	6.8911D-02	2.6435D-02	6.4636D-02	2.4913D-02
7.3747D-03	2.3185D-03	1.6693D-02	5.9485D-03	8.5461D-02	3.1551D-02
1.6905D-02	5.5018D-03	9.1939D-02	3.2936D-02	1.1534D-01	4.2520D-02
1.3515D-03	2.9281D-04	-9.0993D-02	-3.4305D-02	2.7042D-02	1.0950D-02
7.3747D-03	2.3185D-03	1.6693D-02	5.9485D-03	8.5461D-02	3.1551D-02
1.6905D-02	5.5018D-03	9.1939D-02	3.2936D-02	1.1534D-01	4.2520D-02
1.3515D-03	2.9281D-04	-9.0993D-02	-3.4305D-02	2.7042D-02	1.0950D-02
-4.8424D-02	-1.6393D-02	-9.6975D-02	-3.5301D-02	-9.0160D-02	-3.4004D-02
8.9221D-02	3.0024D-02	-9.2383D-02	-3.3851D-02	1.2663D-02	5.0245D-03
-6.9066D-02	-2.3085D-02	1.0782D-01	3.9628D-02	-8.0024D-03	-3.1080D-03
-3.6702D-02	-1.2397D-02	-1.2015D-01	-4.4091D-02	-1.0366D-01	-3.9228D-02
6.9895D-02	2.3414D-02	-1.5426D-02	-7.3109D-03	-4.4494D-04	-1.2585D-04
5.6062D-03	1.9786D-03	-1.6303D-04	-6.9089D-05	8.5984D-02	3.2421D-02
-8.1326D-03	-2.8229D-03	-5.8867D-04	-1.9528D-04	-1.0048D-01	-3.7284D-02
1.7781D-01	6.0011D-02	1.6293D-02	3.3239D-03	-1.0073D-04	-9.6232D-06
-5.2947D-02	-1.7806D-02	-9.3288D-02	-3.3955D-02	9.3236D-02	3.5262D-02
-8.6625D-02	-2.9200D-02	9.1807D-02	3.3620D-02	9.8329D-03	3.9407D-03
6.6347D-02	2.2260D-02	-1.0613D-01	-3.8995D-02	-3.9286D-03	-1.5541D-03
-4.1248D-02	-1.3789D-02	-1.1509D-01	-4.2242D-02	1.0929D-01	4.1455D-02
-3.9786D-02	-1.3388D-02	6.0692D-02	2.1809D-02	4.3464D-02	1.7139D-02
5.7279D-02	1.9192D-02	4.4448D-02	1.6928D-02	1.0150D-02	2.5422D-03
-1.4946D-01	-5.0460D-02	-3.7206D-02	-1.4436D-02	-3.6990D-02	-1.1788D-02
-9.5952D-02	-3.2447D-02	8.0033D-02	2.8183D-02	3.5261D-02	1.4210D-02

1.0130D-01	3.4131D-02	6.4717D-02	2.3919D-02	-7.5648D-04	-2.5541D-04
-2.4999D-03	-8.1848D-04	-2.1459D-03	-8.4184D-04	-1.4795D-01	-5.5677D-02
2.5218D-03	8.2500D-04	3.7290D-03	1.4291D-03	1.7888D-01	6.7739D-02
7.7917D-02	2.6096D-02	6.7983D-02	2.5022D-02	-6.8840D-04	-2.3780D-04
-3.0189D-02	-1.0102D-02	6.0768D-02	2.1777D-02	-4.3618D-02	-1.7140D-02
-6.2945D-02	-2.1223D-02	-4.3554D-02	-1.6669D-02	9.7271D-03	2.4268D-03
1.5766D-01	5.3389D-02	3.5949D-02	1.4046D-02	-3.7511D-02	-1.2009D-02
-8.1980D-02	-2.7699D-02	7.8878D-02	2.7714D-02	-3.6799D-02	-1.4722D-02
-1.0297D-04	-7.9074D-05	-8.3300D-02	-2.8861D-02	1.1244D-03	3.9659D-04
2.1686D-02	7.2818D-03	-7.9307D-04	-2.9026D-04	-8.2880D-02	-2.9622D-02
2.3039D-04	1.4274D-04	-2.8498D-02	-9.9752D-03	1.0450D-01	3.7971D-02
-1.5563D-03	-5.8744D-04	-1.1332D-01	-3.9774D-02	2.4272D-02	8.8190D-03
3.6694D-02	1.2403D-02	8.4342D-05	2.8300D-05	-8.9268D-05	-2.9516D-05
-5.7878D-02	-2.0453D-02	-7.3159D-02	-2.5520D-02	-1.2141D-02	-4.5413D-03
9.6245D-02	3.4170D-02	1.2995D-02	4.7049D-03	-7.3442D-02	-2.6494D-02
-1.0887D-02	-3.7506D-03	2.0798D-02	7.4870D-03	-9.7014D-02	-3.8377D-02
-9.4750D-03	-3.3149D-03	9.7948D-02	3.7608D-02	2.3679D-02	8.8276D-03
2.2710D-01	8.0518D-02	-7.6388D-02	-2.6739D-02	-5.0857D-04	-2.7739D-04
-3.7631D-01	-1.3341D-01	2.7883D-02	1.0095D-02	-8.4451D-02	-3.0528D-02
2.1072D-01	7.4834D-02	-7.0435D-02	-2.4629D-02	-2.4534D-02	-9.1846D-03
3.8616D-01	1.3694D-01	4.1127D-03	1.4431D-03	-9.0216D-02	-3.2768D-02
-4.4130D-01	-1.5641D-01	-9.5384D-02	-3.3493D-02	-1.8232D-02	-6.7055D-03
-9.3953D-03	-3.2084D-03	1.0806D-02	3.9281D-03	-6.6357D-02	-2.3873D-02
-7.7974D-01	-2.6739D-01	-2.3706D-02	-1.1393D-02	1.2865D+00	4.7483D-01
-1.1795D+00	-4.0468D-01	1.1650D+00	4.1701D-01	1.1520D+00	4.2135D-01
-5.5783D-01	-1.8982D-01	-1.1255D-01	-4.5768D-02	1.0166D+00	3.7706D-01
-7.5729D-01	-2.5684D-01	8.9532D-01	3.2239D-01	7.7420D-01	2.8163D-01
1.4101D+00	4.8349D-01	1.9257D+00	6.8568D-01	-3.8134D-02	-1.4609D-02
-8.4269D-02	-2.8726D-02	-1.6459D-01	-5.9095D-02	-7.9020D-01	-2.9481D-01
9.3110D-01	3.1617D-01	1.3832D+00	4.9249D-01	-2.9932D-02	-1.1376D-02
-1.0177D-01	-3.4967D-02	-1.5544D-01	-5.5796D-02	-7.1741D-01	-2.7154D-01
-6.3332D-01	-2.1713D-01	-2.0552D-01	-7.7071D-02	-1.0588D+00	-3.9060D-01
1.2624D+00	4.3286D-01	-1.1888D+00	-4.2493D-01	1.3305D+00	4.8803D-01
-3.8061D-01	-1.2859D-01	-2.7724D-01	-1.0523D-01	-7.9850D-01	-2.9654D-01
8.5841D-01	2.9181D-01	-9.2770D-01	-3.3342D-01	9.3612D-01	3.4229D-01
1.1428D-01	3.8556D-02	8.5248D-02	3.1516D-02	-1.6885D-01	-6.5131D-02
-1.1522D-01	-3.8857D-02	-9.3582D-02	-3.4790D-02	-1.6939D-01	-6.5369D-02
1.1446D-01	3.8878D-02	1.0512D-01	3.9489D-02	1.5749D-01	6.0424D-02
-1.1600D-01	-3.8878D-02	1.9472D-01	7.2733D-02	3.6623D-03	1.6166D-03
1.1457D-01	3.8714D-02	-1.8870D-01	-7.0482D-02	1.1452D-02	4.6864D-03
-1.1580D-01	-3.8992D-02	-9.9925D-02	-3.7547D-02	1.6554D-01	6.3676D-02

Columns 7 thru 12

-2.2690D-08	-1.5670D-08	-9.2989D-07	-4.8631D-07	-1.1365D-06	-1.2522D-06
-5.5414D-08	2.2461D-06	1.9090D-06	5.2334D-08	-3.9827D-07	-3.5775D-07
-3.6813D-07	-2.5596D-06	1.0840D-05	-1.3161D-06	-3.6518D-06	-1.5183D-06
-2.2690D-08	-1.5670D-08	-9.2989D-07	-4.8631D-07	-1.1365D-06	-1.2522D-06
-5.5414D-08	2.2461D-06	1.9090D-06	5.2334D-08	-3.9827D-07	-3.5775D-07
-3.6813D-07	-2.5596D-06	1.0840D-05	-1.3161D-06	-3.6518D-06	-1.5183D-06
5.6582D-08	-1.9211D-06	-2.0932D-07	-9.5405D-07	-1.5844D-06	-1.2892D-07
1.0159D-08	-1.1309D-06	1.5656D-06	1.0408D-06	-1.0573D-06	-8.3722D-08

-3.5875D-07	-2.5276D-06	-2.4547D-06	2.0902D-06	1.1243D-05	-6.3369D-07
5.6582D-08	-1.9211D-06	-2.0932D-07	-9.5405D-07	-1.5844D-06	-1.2892D-07
1.0159D-08	-1.1309D-06	1.5656D-06	1.0408D-06	-1.0573D-06	-8.3722D-08
-3.5875D-07	-2.5276D-06	-2.4547D-06	2.0902D-06	1.1243D-05	-6.3369D-07
-3.8713D-08	1.9793D-06	-9.0238D-07	1.4185D-07	-1.8675D-06	-3.9686D-07
4.4639D-08	-1.0757D-06	1.1080D-06	8.0634D-07	-4.1566D-07	-1.0067D-06
-3.7454D-07	-2.5639D-06	-8.4358D-06	-5.2719D-07	-7.3713D-06	1.9881D-06
-3.8713D-08	1.9793D-06	-9.0238D-07	1.4185D-07	-1.8675D-06	-3.9686D-07
4.4639D-08	-1.0757D-06	1.1080D-06	8.0634D-07	-4.1566D-07	-1.0067D-06
-3.7454D-07	-2.5639D-06	-8.4358D-06	-5.2719D-07	-7.3713D-06	1.9881D-06
-2.7278D-07	-7.8434D-06	4.8559D-06	4.9786D-07	-6.8664D-06	-2.4704D-06
-1.4162D-07	-3.7920D-06	-2.4910D-06	-2.0622D-06	-6.0780D-06	-8.9249D-07
1.8124D-07	4.3637D-06	5.4102D-06	3.1406D-06	7.3361D-06	8.1678D-07
-3.1973D-07	-8.7502D-06	6.7930D-06	1.2222D-06	-6.6786D-06	-2.9912D-06
-3.0099D-09	6.0313D-07	-1.2013D-06	-9.8627D-07	-4.2683D-06	-1.0324D-06
-1.8393D-08	-8.5781D-06	8.8973D-07	5.1848D-07	-3.6068D-07	-3.9018D-07
9.7122D-08	1.3313D-05	-8.1544D-07	-4.6739D-07	4.6212D-07	4.1325D-07
1.3044D-08	1.1639D-06	-8.6353D-07	-7.0123D-07	-2.4591D-06	-1.1069D-06
2.6057D-07	7.3533D-06	-7.4770D-06	-2.9804D-06	-5.4109D-06	1.2488D-06
-1.6584D-07	-4.9580D-06	-1.0896D-07	8.1320D-07	6.6164D-06	1.5154D-06
1.8552D-07	5.4824D-06	2.3041D-06	-6.0095D-07	-9.0009D-06	-2.7125D-06
3.1829D-07	8.2995D-06	-9.0952D-06	-3.5377D-06	-4.7158D-06	1.8533D-06
1.9858D-08	7.2069D-06	-2.1025D-06	-8.4542D-07	-1.5733D-06	-1.2458D-07
6.5368D-09	4.7789D-06	3.7389D-06	1.2178D-06	5.2867D-07	-6.3727D-07
-6.1596D-08	-7.6404D-06	-2.1694D-06	-1.0705D-06	5.1594D-08	2.3071D-07
8.0098D-08	1.1024D-05	-1.3391D-06	-8.9662D-07	-1.3883D-06	-1.0906D-07
2.3009D-08	6.0852D-07	7.2252D-07	1.2091D-06	4.9318D-06	1.5749D-06
3.0770D-07	8.8394D-06	9.9755D-06	1.0641D-06	-2.2408D-06	-1.8175D-06
-3.6865D-07	-9.9217D-06	-1.0614D-05	-1.2735D-06	2.3575D-06	1.9451D-06
1.3780D-08	5.3334D-07	1.5233D-06	2.1159D-06	8.5489D-06	2.4746D-06
-1.0638D-08	-7.6980D-06	7.1035D-07	-1.4849D-07	-2.0299D-06	-9.3523D-07
1.1288D-08	3.8527D-06	3.1501D-06	5.5198D-07	-2.4075D-06	-1.0837D-06
-3.6517D-08	-5.7072D-06	-2.0461D-06	-6.6791D-07	1.4925D-06	9.6235D-07
-8.7451D-08	-1.2109D-05	-1.2882D-07	1.3822D-07	-1.2659D-06	-8.4260D-07
4.9540D-09	-1.2033D-07	2.4516D-06	2.3733D-06	8.7002D-06	3.1929D-06
4.1425D-09	5.2624D-08	-8.6783D-06	-3.4383D-06	2.0897D-06	2.6412D-06
2.0762D-09	3.2148D-07	1.3012D-05	4.9777D-06	-8.2807D-07	-2.8642D-06
2.9433D-08	9.1988D-07	5.0558D-06	4.1296D-06	1.3611D-05	4.2125D-06
7.7856D-09	2.2122D-07	-1.0124D-08	-1.4916D-08	-8.0224D-09	1.5920D-08
2.3903D-08	-1.8792D-07	-3.0014D-06	-2.2488D-06	-1.0835D-05	-8.6920D-07
-5.9548D-08	2.5718D-07	1.0444D-05	1.2359D-06	-3.0943D-06	-2.4373D-06
-2.3197D-10	5.8246D-10	1.1640D-05	-1.5983D-06	-4.7216D-06	-1.5637D-06
1.2444D-08	9.0599D-08	4.1937D-06	1.6703D-06	1.1840D-05	-1.7015D-06
-1.3820D-07	1.0928D-06	-2.7922D-06	-1.8921D-06	-1.0703D-05	-1.3873D-06
2.2600D-07	-8.7254D-07	9.5099D-06	8.6131D-07	-1.7404D-06	-1.3677D-06
-1.4145D-07	2.2568D-07	-2.3123D-06	-1.6427D-06	-9.2771D-06	-1.4681D-06
-2.2848D-07	1.3694D-06	1.1238D-05	1.7690D-06	-1.9497D-06	-3.1121D-06
2.5315D-07	-1.2732D-06	-1.4948D-06	-2.6755D-06	-1.0664D-05	-3.7334D-07
-4.6016D-09	-5.0813D-07	9.9497D-06	1.0782D-06	-3.1006D-06	-2.1488D-06
4.4076D-07	6.6395D-05	4.4605D-05	8.0896D-06	5.5902D-05	-1.2889D-05
-3.9164D-07	-4.5360D-05	-5.2418D-05	1.2857D-06	-1.4965D-05	8.4385D-06

-3.3024D-08	5.1889D-05	3.8233D-05	8.4739D-06	4.8862D-05	-8.4775D-06
-3.9155D-07	-3.1883D-05	-3.8197D-05	-1.5854D-06	-1.3686D-05	6.2632D-06
1.0819D-07	5.8257D-06	1.1148D-06	3.7732D-06	2.7562D-05	-3.4969D-06
6.1144D-07	8.0007D-05	-8.1568D-05	1.0350D-05	3.0665D-05	1.0838D-05
3.2553D-07	1.3036D-06	3.6075D-06	2.6036D-06	1.8392D-05	3.2036D-07
2.0844D-07	6.0796D-05	-6.8939D-05	5.1142D-06	2.2633D-05	1.0205D-05
-5.7177D-07	-7.2295D-05	-1.0955D-06	1.2079D-05	7.8746D-05	-5.2364D-06
-1.7278D-07	-3.4705D-05	-2.8829D-05	8.0009D-06	3.1268D-05	3.1533D-06
-3.5091D-07	-5.3510D-05	-4.3457D-06	1.0523D-05	6.3058D-05	-1.0297D-06
2.2532D-07	-2.9016D-05	-2.3363D-05	3.8072D-06	2.9086D-05	4.3890D-06
3.7999D-07	8.3432D-06	6.6734D-06	1.6822D-06	6.5452D-06	1.7461D-06
3.4524D-07	6.8786D-06	3.9393D-06	-2.2233D-06	-9.2833D-06	-2.9208D-06
3.5843D-07	8.2885D-06	-8.9033D-06	-2.7878D-06	1.7344D-06	1.5154D-06
3.5054D-07	6.7008D-06	6.0556D-06	3.4424D-06	7.3324D-06	6.9728D-08
3.7013D-07	8.4175D-06	2.7759D-06	-6.8856D-08	-9.3742D-06	-2.3148D-06
3.6362D-07	6.8463D-06	-9.4086D-06	-2.4500D-06	6.5743D-07	3.8078D-06
3.0615D-06	-1.7422D-08	9.6900D-05	-2.0577D-04	1.9255D-04	-2.4036D-04
-4.2588D-04	-4.7815D-06	1.8171D-05	3.9840D-04	6.5356D-05	-8.8292D-05
4.8544D-04	-3.4856D-05	4.9625D-04	2.2641D-03	2.5169D-04	-8.0091D-04
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4.8544D-04	-3.4856D-05	4.9625D-0[illegible]	2.2641D-03	2.5169D-04	-8.0091D-04
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2.1445D-04	2.4836D-06	-1.5860D-04	3.2812D-04	1.3130D-06	-2.3022D-04
4.7979D-04	-3.3125D-05	-5.0896D-04	-4.8055D-04	3.5760D-04	2.3694D-03
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-3.7531D-04	-4.0233D-06	-2.9497D-05	-1.9273D-04	4.9920D-05	-3.9183D-04
2.0395D-04	2.3158D-06	-1.2742D-04	2.3215D-04	1.9240D-04	-9.5614D-05
4.8612D-04	-3.3507D-05	-3.7542D-05	-1.7935D-03	-5.6990D-04	-1.5209D-03
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1.4873D-03	-6.0844D-05	-6.5510D-05	1.0254D-03	5.8390D-04	-1.4315D-03
7.1894D-04	-3.4597D-05	3.2432D-04	-5.2371D-04	2.0789D-04	-1.2476D-03
-8.2735D-04	4.0622D-05	-5.3943D-04	1.1343D-03	-1.8254D-04	1.5084D-03
1.6592D-03	-7.2309D-05	-2.0847D-04	1.4302D-03	6.9534D-04	-1.3937D-03
-1.1438D-04	9.8588D-07	2.2568D-04	-2.3924D-04	2.7249D-04	-8.8806D-04
1.6265D-03	-1.9552D-05	-1.8682D-04	1.8261D-04	1.0406D-04	-6.0858D-05
-2.5244D-03	3.8089D-05	1.8593D-04	-1.6689D-04	-1.1298D-04	8.0069D-05
-2.2082D-04	9.0134D-07	1.6115D-04	-1.6896D-04	2.8774D-04	-5.1098D-04
-1.3943D-03	5.9914D-05	6.2489D-04	-1.5438D-03	-1.8124D-04	-1.1219D-03
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-1.0396D-03	4.1426D-05	2.3353D-04	4.7919D-04	5.0324D-04	-1.8974D-03
-1.5738D-03	7.0770D-05	7.3236D-04	-1.8799D-03	-2.9853D-04	-9.7527D-04
-1.3664D-03	1.6514D-05	1.8352D-04	-4.2423D-04	1.0433D-04	-3.2367D-04
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-2.0902D-03	3.2563D-05	1.9140D-04	-2.6539D-04	1.0330D-04	-2.8410D-04
-1.1532D-04	1.2326D-06	-2.3617D-04	1.7119D-04	-2.1079D-04	1.0325D-03

-1.6760D-03	6.9350D-05	-2.8989D-04	2.0747D-03	3.9981D-04	-4.5399D-04
1.8812D-03	-8.2229D-05	3.3084D-04	-2.2079D-03	-4.2599D-04	4.7878D-04
-1.0107D-04	2.0553D-06	-4.1662D-04	3.3980D-04	-3.8905D-04	1.7859D-03
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2.2961D-03	-3.3899D-05	5.7474D-06	-1.2087D-05	2.4861D-04	-2.6443D-04
2.2796D-05	2.4679D-07	-4.6707D-04	5.3388D-04	-5.3552D-04	1.8175D-03
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-1.6754D-05	-1.0367D-07	-2.7536D-04	9.3719D-04	7.1350D-04	2.4783D-03
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-2.5917D-04	2.6864D-06	-5.9140D-05	2.3232D-03	4.2669D-04	-4.6289D-04
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-1.2591D-02	5.6527D-06	-1.8005D-03	9.2022D-03	2.2477D-03	1.1632D-02
8.6016D-03	3.2768D-06	1.8438D-04	-1.0897D-02	-1.8849D-03	-3.1953D-03
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-1.5172D-02	9.9955D-06	-1.6966D-03	-1.6966D-02	-2.4186D-03	6.2976D-03
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-1.5818D-03	7.1340D-05	-5.4752D-04	1.4133D-03	-1.1294D-04	1.4137D-03
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-1.5717D-03	7.0752D-05	4.7835D-04	-1.9068D-03	-5.8831D-04	3.5839D-04
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-1.2982D-03	6.9144D-05	5.4260D-04	-1.9091D-03	-5.0343D-04	1.5238D-04
1.1199D-04	5.8595D-04	4.2449D-02	2.0883D-02	5.1182D-02	4.2459D-02
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-1.0427D-03	6.9071D-02	1.0745D-02	3.7386D-02	6.8395D-02	9.3823D-04
-5.3265D-04	4.0669D-02	-6.9035D-02	-3.5003D-02	4.7363D-02	5.0249D-04
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6.8487D-03	9.0980D-02	9.9486D-02	-1.0415D-01	-4.8973D-01	7.0555D-02
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6.8576D-03	9.2142D-02	3.7070D-01	-4.9863D-03	3.1530D-01	-1.1503D-01
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5.8626D-03	1.3629D-01	1.0882D-01	7.0958D-02	2.6115D-01	4.5293D-02
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1.2266D-02	3.1452D-01	-2.9938D-01	-4.7307D-02	2.9114D-01	1.4738D-01
-4.9330D-05	-2.1685D-02	4.9616D-02	4.7237D-02	1.8607D-01	5.8365D-02
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-6.9442D-03	-1.9708D-01	-1.0100D-01	4.5494D-02	3.9597D-01	1.1060D-01
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-2.0967D-03	-2.5910D-01	8.8673D-02	3.9377D-02	6.8398D-02	2.0843D-02
-1.3818D-03	-1.7180D-01	-1.6256D-01	-6.7390D-02	-2.5399D-02	3.2100D-02
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4.7944D-03	4.3538D-01	2.2938D-03	-3.1435D-04	5.5892D-02	5.1899D-02
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-2.2899D-05	-1.9012D-03	3.7958D-01	1.2881D-01	-9.5692D-02	-1.0815D-01
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-1.1129D-03	-3.3089D-02	-2.2391D-01	-1.7406D-01	-5.9495D-01	-1.6141D-01
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7.9581D-06	6.7242D-03	1.3654D-01	8.5557D-02	4.7060D-01	2.6787D-03
2.7600D-04	-9.2500D-03	-4.5260D-01	-8.5899D-03	1.4261D-01	8.4704D-02
1.2990D-04	-9.4220D-05	-5.0282D-01	1.3756D-01	2.1572D-01	4.5337D-02
6.2713D-05	-3.1520D-03	-1.9329D-01	-5.8432D-02	-5.1230D-01	1.4161D-01
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-5.3111D-04	3.1249D-02	-4.1790D-01	-1.6529D-02	7.9516D-02	7.6836D-02
4.3787D-04	-8.0721D-03	1.0994D-01	7.3696D-02	4.0577D-01	6.6664D-03
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-6.3430D-04	4.5643D-02	6.6920D-02	8.4595D-02	4.5962D-01	1.1312D-02
7.5224D-05	1.8246D-02	-4.3230D-01	-6.8034D-03	1.4193D-01	7.9872D-02
1.8543D-03	-2.3876D+00	-1.9138D+00	-3.7221D-01	-2.4150D+00	4.7994D-01
-1.9191D-03	1.6313D+00	2.2611D+00	2.4211D-02	6.6248D-01	-3.8565D-01
8.8878D-03	-1.8661D+00	-1.6232D+00	-3.9369D-01	-2.1115D+00	1.9624D-01
-4.6111D-03	1.1467D+00	1.6543D+00	2.4426D-01	6.2261D-01	-3.4792D-01
6.2946D-04	-2.0958D-01	-4.0188D-02	-1.7986D-01	-1.1890D+00	1.0581D-01

1.3857D-03	-2.8769D+00	3.5200D+00	-3.6583D-01	-1.3085D+00	-4.9564D-01
-6.4097D-04	-4.7180D-02	-1.3866D-01	-1.6781D-01	-7.9915D-01	-1.0849D-01
9.3236D-03	-2.1863D+00	2.9780D+00	-6.2959D-02	-9.4976D-01	-4.9356D-01
-2.7432D-03	2.6000D+00	6.1689D-02	-5.2522D-01	-3.3989D+00	1.3785D-01
-1.3171D-03	1.2482D+00	1.2411D+00	-2.9391D-01	-1.3410D+00	-1.5009D-01
-9.0073D-03	1.9245D+00	2.1801D-01	-4.6637D-01	-2.7220D+00	-1.3641D-01
-6.0714D-03	1.0434D+00	1.0041D+00	-4.9094D-02	-1.2378D+00	-2.0239D-01
-1.2418D-02	-2.9988D-01	-2.9380D-01	-1.1437D-01	-2.9511D-01	-3.0934D-02
-1.1806D-02	-2.4726D-01	-1.6446D-01	4.4331D-02	3.9678D-01	1.1293D-01
-1.2218D-02	-2.9794D-01	3.9782D-01	1.0621D-01	-7.4745D-02	-1.1994D-01
-1.2047D-02	-2.4083D-01	-2.6003D-01	-1.0716D-01	-3.0934D-01	-4.5050D-02
-1.2044D-02	-3.0261D-01	-1.2728D-01	5.8055D-02	4.1669D-01	1.1085D-01
-1.2068D-02	-2.4608D-01	3.9994D-01	1.1713D-01	-3.1619D-02	-1.1139D-01

Columns 13 thru 14

2.9239D-06	4.4333D-07
-5.5327D-08	-3.9738D-10
1.5687D-07	3.0286D-08
2.9239D-06	4.4333D-07
-5.5327D-08	-3.9738D-10
1.5687D-07	3.0286D-08
-1.3061D-06	-2.0406D-07
2.6941D-06	3.8400D-07
7.6885D-08	-3.7758D-08
-1.3061D-06	-2.0406D-07
2.6941D-06	3.8400D-07
7.6885D-08	-3.7758D-08
-1.6082D-06	-2.1471D-07
-2.5868D-06	-3.6100D-07
1.4308D-07	2.9858D-08
-1.6082D-06	-2.1471D-07
-2.5868D-06	-3.6100D-07
1.4308D-07	2.9858D-08
2.0843D-09	9.2025D-08
2.5429D-07	-2.0223D-07
1.5132D-06	9.5763D-08
9.5489D-07	2.4198D-08
1.1609D-08	7.6847D-08
-9.4926D-08	-1.0246D-08
6.5061D-08	1.2986D-08
1.7556D-06	-9.1240D-08
-2.1625D-07	8.3154D-08
-2.0363D-07	1.8514D-07
-1.4965D-06	-7.2597D-08
8.5988D-07	1.9172D-08
-5.9318D-07	-6.0556D-08
1.0786D-06	7.8075D-08
-1.5024D-06	7.1097D-08
-9.7906D-07	1.5176D-08
2.5535D-07	-2.3226D-07
-6.0825D-08	-2.5233D-08

6.1421D-08	3.0128D-08
-1.8580D-06	-1.1143D-07
-6.2837D-07	-6.5360D-08
-1.0642D-06	-1.0590D-07
1.5792D-06	-3.3010D-08
-8.6416D-07	1.7033D-08
1.0986D-08	-1.8609D-08
7.7900D-07	-7.2008D-08
1.8918D-07	1.9021D-08
-2.9538D-07	-2.0325D-08
1.3349D-06	-1.0018D-07
-6.5698D-07	-5.1253D-07
1.0706D-06	9.8093D-07
-4.9776D-07	4.7486D-08
-4.0459D-07	-5.2044D-08
2.5493D-06	2.2266D-06
-3.7085D-06	-3.7425D-06
1.9302D-06	2.2115D-06
4.0800D-06	3.8224D-06
-4.4811D-06	-4.3304D-06
-3.5076D-07	2.7449D-08
1.0203D-05	7.4124D-07
1.6135D-05	1.3439D-06
-9.7479D-06	3.2902D-06
-1.5298D-05	5.6519D-06
-1.8618D-05	-1.5029D-06
8.0711D-07	-1.4065D-08
1.7649D-05	-6.3377D-06
-8.2057D-07	5.4262D-08
8.7776D-06	8.6069D-07
-1.6676D-05	-1.2576D-06
-8.2713D-06	3.3535D-06
1.5862D-05	-5.4791D-06
3.2139D-06	-1.1452D-07
-3.1428D-06	2.3839D-08
3.1602D-06	2.8578D-08
-2.9675D-06	1.2760D-07
3.1638D-06	-4.9296D-08
-3.0578D-06	-1.5879D-08
-4.8469D-06	1.3285D-03
9.6222D-07	-2.5023D-05
3.8193D-07	7.1642D-05
-4.8469D-06	1.3285D-03
9.6222D-07	-2.5023D-05
3.8193D-07	7.1642D-05
8.5790D-07	-5.9346D-04
-6.0024D-06	1.2238D-03
4.2755D-07	3.4180D-05
8.5790D-07	-5.9346D-04
-6.0024D-06	1.2238D-03
4.2755D-07	3.4180D-05

5.2579D-06	-7.3025D-04
2.9502D-06	-1.1750D-03
6.8965D-07	6.5179D-05
5.2579D-06	-7.3025D-04
2.9502D-06	-1.1750D-03
6.8965D-07	6.5179D-05
-5.6909D-07	1.7247D-06
-2.2277D-06	1.1295D-04
-1.0688D-05	6.8704D-04
-7.5898D-06	4.3282D-04
9.2218D-06	5.2722D-04
9.1974D-07	-4.3189D-05
-1.7081D-06	2.9678D-05
-5.0389D-06	7.9499D-04
3.0988D-06	-9.7134D-05
1.7896D-06	-9.0471D-05
1.0497D-05	-6.7887D-04
-5.6023D-06	3.8988D-04
-4.4794D-06	-2.6977D-04
7.6886D-06	4.8984D-04
3.9704D-06	-6.8040D-04
2.5715D-06	-4.4388D-04
-3.1628D-06	1.1316D-04
2.0846D-06	-2.7856D-05
-2.7242D-06	2.8200D-05
1.2412D-05	-8.4338D-04
-5.6327D-06	-2.8573D-04
-6.7007D-06	-4.8382D-04
-5.9896D-06	7.1578D-04
6.7376D-07	-3.9178D-04
-1.9214D-07	4.6988D-06
-9.2818D-06	3.5375D-04
-2.8177D-06	8.6151D-05
2.9170D-07	-1.3451D-04
-1.6344D-05	6.0659D-04
-1.3752D-05	-3.0207D-04
2.2333D-05	4.9435D-04
-3.0341D-07	-2.2467D-04
-5.1412D-07	-1.8423D-04
5.2953D-05	1.1756D-03
-9.0989D-05	-1.7140D-03
5.1317D-05	8.9488D-04
9.0984D-05	1.8837D-03
-1.0551D-04	-2.0695D-03
-1.4366D-06	-1.5840D-04
4.1545D-05	4.6319D-03
6.3700D-05	7.3260D-03
2.6149D-05	-4.3881D-03
5.9946D-05	-6.8823D-03
-7.6839D-05	-8.4527D-03
2.6544D-06	3.6633D-04

-6.3799D-05	7.9436D-03
-6.6210D-06	-3.7035D-04
3.4467D-05	3.9869D-03
-6.7747D-05	-7.5698D-03
3.8029D-05	-3.7180D-03
-5.1731D-05	7.1415D-03
2.1707D-07	1.4548D-03
-1.8031D-06	-1.4243D-03
1.4589D-06	1.4328D-03
-5.5545D-06	-1.3431D-03
-5.9624D-07	1.4334D-03
-3.4793D-06	-1.3862D-03
-6.0211D-01	-1.4163D-02
1.1342D-02	6.9462D-04
-3.2472D-02	8.2591D-05
-6.0211D-01	-1.4163D-02
1.1342D-02	6.9462D-04
-3.2472D-02	8.2591D-05
2.6898D-01	6.0206D-03
-5.5469D-01	-1.3256D-02
-1.5458D-02	3.7280D-04
2.6898D-01	6.0206D-03
-5.5469D-01	-1 3256D-02
-1.5458D-02	3.7280D-04
3.3101D-01	8.5937D-03
5.3257D-01	1.1691D-02
-2.9526D-02	2.4229D-04
3.3101D-01	8.5937D-03
5.3257D-01	1.1691D-02
-2.9526D-02	2.4229D-04
-7.4262D-04	-1.5163D-03
-5.1227D-02	9.3903D-04
-3.1120D-01	-9.0121D-03
-1.9604D-01	-5.9748D-03
-2.3880D-01	5.7585D-03
1.9577D-02	6.7995D-04
-1.3458D-02	-9.4106D-04
-3.6010D-01	-2.6167D-03
4.4022D-02	5.5327D-04
4.1020D-02	-1.3677D-03
3.0753D-01	9.1633D-03
-1.7663D-01	-4.6894D-03
1.2218D-01	-2.8820D-03
-2.2188D-01	4.5508D-03
3.0820D-01	2.2667D-03
2.0106D-01	1.4034D-03
-5.1353D-02	8.9862D-04
1.2627D-02	1.1049D-03
-1.2776D-02	-1.4166D-03
3.8199D-01	1.0625D-02
1.2943D-01	-3.1231D-03

2.1916D-01	-4.3885D-03
-3.2423D-01	-3.0376D-03
1.7747D-01	6.6833D-04
-2.1709D-03	-5.9198D-05
-1.5991D-01	-8.3242D-04
-3.8956D-02	-1.0003D-03
6.0803D-02	-3.4750D-04
-2.7414D-01	-1.6257D-03
1.3700D-01	-2.4380D-04
-2.2414D-01	-2.2845D-04
1.0178D-01	-4.9860D-04
8.3473D-02	-3.5880D-04
-5.3306D-01	7.9088D-06
7.7734D-01	3.4716D-04
-4.0586D-01	-7.5317D-04
-8.5421D-01	-2.7920D-04
9.3852D-01	1.4470D-04
7.1791D-02	-6.4631D-04
-2.0987D+00	1.4210D-02
-3.3196D+00	1.9260D-02
1.9874D+00	-3.2128D-02
3.1169D+00	-4.9413D-02
3.8302D+00	-2.4243D-02
-1.6575D-01	2.2922D-03
-3.5974D+00	5.9214D-02
1.6795D-01	-2.9375D-03
-1.8065D+00	9.5906D-03
3.4302D+00	-2.2103D-02
1.6838D+00	-2.6901D-02
-3.2342D+00	5.2581D-02
-6.5925D-01	-1.9446D-03
6.4535D-01	1.1706D-03
-6.4922D-01	-1.5260D-03
6.0858D-01	-5.2696D-04
-6.4949D-01	-2.0800D-03
6.2805D-01	7.3741D-04

$\mathbf{D}_{cy}$ =

Columns 1 thru 6

7.8507D-08	1.1008D-08	1.9398D-07	1.3063D-07	-4.2263D-08	-2.6062D-11
-2.0423D-08	2.8342D-08	-1.0337D-08	7.2621D-08	-3.4935D-10	2.3483D-08
-3.4956D-08	2.5830D-07	-1.7844D-08	6.1966D-07	1.6556D-09	1.9264D-08
7.8507D-08	1.1008D-08	1.9398D-07	1.3063D-07	-4.2263D-08	-2.6062D-11
-2.0423D-08	2.8342D-08	-1.0337D-08	7.2621D-08	-3.4935D-10	2.3483D-08
-3.4956D-08	2.5830D-07	-1.7844D-08	6.1966D-07	1.6556D-09	1.9264D-08
4.5665D-08	-4.2377D-08	5.2438D-08	-9.5710D-08	3.6841D-08	-3.4014D-09
-9.9674D-09	6.5648D-08	4.3656D-08	2.2146D-07	-3.5054D-08	6.9984D-08
-2.4394D-07	-9.7997D-08	-5.3679D-07	-2.9097D-07	-2.0575D-07	-1.6171D-07
4.5665D-08	-4.2377D-08	5.2438D-08	-9.5710D-08	3.6841D-08	-3.4014D-09
-9.9674D-09	6.5648D-08	4.3656D-08	2.2146D-07	-3.5054D-08	6.9984D-08

-2.4394D-07	-9.7997D-08	-5.3679D-07	-2.9097D-07	-2.0575D-07	-1.6171D-07
6.9560D-09	-2.7981D-08	-8.6561D-09	-9.7359D-08	3.[illegible]65D-08	5.3998D-09
-2.8853D-08	-2.5696D-08	-9.6854D-08	-1.1773D-07	3.7986D-08	7.3107D-08
1.5044D-08	-9.2721D-09	4.7147D-07	-2.7509D-07	2.0538D-07	-1.6179D-07
6.9560D-09	-2.7981D-08	-8.6561D-09	-9.7359D-08	3.7765D-08	5.3998D-09
-2.8853D-08	-2.5696D-08	-9.6854D-08	-1.1773D-07	3.7986D-08	7.3107D-08
1.5044D-08	-9.2721D-09	4.7147D-07	-2.7509D-07	2.0538D-07	-1.6179D-07
-9.6648D-09	8.4483D-08	-1.2426D-07	8.6461D-08	-1.4589D-08	3.4137D-08
2.9533D-08	-9.1688D-08	-8.6634D-09	-2.7782D-07	9.0826D-08	-7.8830D-08
-8.4560D-08	5.2178D-08	-4.9207D-08	2.0907D-07	-6.5014D-08	1.0504D-07
-1.7794D-08	9.7848D-08	-1.5523D-07	5.6898D-08	4.4442D-08	5.0371D-08
-3.3648D-08	8.3538D-08	-1.1747D-07	9.6701D-08	-7.8765D-09	-2.2183D-09
1.5966D-08	-1.2194D-07	8.5887D-09	-2.1472D-07	6.8292D-10	-4.1144D-09
-4.6257D-08	1.2188D-07	-2.2331D-08	2.3013D-07	-1.3155D-09	2.8545D-08
-4.4375D-08	7.3227D-08	-1.6787D-07	-3.1249D-10	1.0481D-07	-2.7026D-09
-1.0680D-07	1.2992D-08	-1.8854D-07	4.5502D-08	-2.0859D-08	-3.5637D-08
1.4206D-08	-9.3612D-08	4.3131D-08	-1.4126D-07	-9.2326D-08	-8.0651D-08
-7.5073D-09	1.1971D-07	-1.6552D-09	2.2987D-07	6.8015D-08	1.0657D-07
-1.2183D-07	4.3814D-09	-2.2595D-07	2.4550D-09	3.6618D-08	-5.2654D-08
-1.4348D-07	-4.6743D-08	-2.3419D-07	-5.7669D-08	-5.6396D-08	-2.9379D-08
1.9719D-08	-1.0653D-08	2.8619D-08	-9.9709D-08	-9.6958D-08	-9.8858D-08
-1.0502D-08	1.0579D-08	2.9076D-08	1.7925D-07	7.7020D-08	1.1536D-07
-1.5386D-07	-1.5770D-08	-2.2341D-07	-7.4499D-09	-5.0194D-08	-4.9763D-08
-1.1726D-07	-3.2066D-08	-2.6643D-07	-9.3846D-08	-8.5292D-08	-2.2814D-09
2.4205D-08	2.4742D-08	5.0364D-09	-1.3377D-07	2.9435D-10	-1.1383D-07
-4.2393D-08	-5.8597D-08	-1.2671D-08	1.2766D-07	-3.2955D-10	1.2472D-07
-1.1791D-07	2.8394D-08	-2.3659D-07	1.9850D-09	-1.1533D-07	-4.3295D-09
-4.3972D-09	-3.4323D-09	-1.5736D-07	-3.9461D-08	-5.5282D-08	3.0635D-08
-5.7057D-11	-7.1074D-09	-3.7510D-08	-2.0885D-07	9.7439D-08	-9.8279D-08
-5.9736D-08	-7.1442D-08	-1.5161D-08	1.0886D-07	-7.6604D-08	1.1532D-07
5.4098D-09	5.5076D-08	-1.2188D-07	1.6353D-08	-4.8488D-08	4.9505D-08
-1.2454D-07	5.4919D-08	-2.3349D-07	3.7365D-08	-3.9004D-08	-3.1889D-09
4.7951D-08	-8.2702D-08	2.1070D-08	-2.2846D-07	5.6563D-09	-1.5809D-07
-9.8211D-08	7.2511D-08	-6.2313D-08	2.1334D-07	1.7207D-08	1.9175D-07
-1.6323D-07	9.0678D-08	-2.6899D-07	5.6189D-08	-4.8824D-09	5.0073D-09
-9.3044D-09	-1.6454D-08	-2.7241D-08	-4.8878D-08	1.8905D-08	4.4960D-11
1.5212D-07	-1.6632D-07	3.2075D-07	-3.1553D-07	1.7548D-07	4.5476D-09
8.1594D-09	2.6903D-07	2.2465D-07	9.1109D-07	-1.6789D-07	2.4585D-07
4.7567D-08	3.0012D-07	9.6901D-10	9.3723D-07	4.5555D-09	2.2267D-07
-2.4682D-07	-4.3428D-08	-9.2323D-07	9.8325D-09	-3.2602D-07	-2.5482D-10
3.9610D-07	2.6807D-07	1.0799D-06	1.0264D-06	-3.2205D-07	-1.9472D-09
-4.1156D-07	-4.7807D-07	-1.0790D-06	-1.3992D-06	6.8564D-07	2.5640D-07
3.8839D-07	2.6480D-07	1.0622D-06	1.0198D-06	-3.1902D-07	-1.1286D-09
2.5870D-07	7.1864D-07	1.0003D-06	2.3076D-06	-6.8501D-07	2.4153D-07
-1.8453D-07	-7.6837D-07	-7.2116D-07	-2.1779D-06	8.6598D-07	1.5305D-08
-7.7080D-08	1.1674D-07	-3.6071D-08	4.4253D-07	6.9383D-09	2.4505D-07
8.0513D-07	9.1676D-08	9.6112D-07	3.8681D-07	1.5525D-07	3.6354D-08
9.1903D-08	9.7065D-07	3.8835D-07	1.5130D-06	-1.5246D-07	2.2446D-07
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-4.0652D-07	-1.3477D-07	-1.4043D-06	-7.7628D-07	8.0243D-07	5.2124D-07
-2.5598D-08	-2.4617D-08	-2.7894D-07	-4.5537D-07	-1.6783D-07	-2.8824D-07
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-1.6610D-07	2.9018D-07	-3.3751D-07	5.8544D-07	1.3085D-07	2.8733D-07
-3.2528D-07	2.0100D-09	-6.6252D-07	1.1046D-08	-4.1545D-08	-1.8591D-08
-7.5433D-07	2.4380D-07	-6.5957D-07	2.6544D-07	-3.5628D-07	-1.9216D-07
-4.5541D-08	1.0966D-07	-3.5140D-08	5.7792D-08	1.2703D-08	2.5613D-07
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-9.1777D-04	-1.6228D-03	-2.5153D-03	7.5582D-03	2.5914D-03	-1.2576D-03
-2.5860D-03	1.0220D-03	-2.0377D-03	-5.7703D-03	-1.1929D-03	1.4337D-04

-5.4677D-03	-9.9117D-04	2.4980D-03	-3.9070D-04	-5.4534D-03	1.2388D-03
1.5056D-03	-5.2044D-03	8.8851D-04	-2.3601D-03	-1.4502D-03	-5.0584D-03
1.8484D-03	-1.1307D-03	-7.1888D-03	-4.8772D-03	-1.3801D-03	2.6558D-03
5.1433D-05	-2.0183D-03	4.8961D-03	-1.0613D-03	1.3548D-03	1.5639D-03
1.6249D-03	-3.4823D-03	1.3655D-04	-1.4021D-03	2.6013D-03	8.4464D-04
-1.9603D-03	-2.1984D-03	2.0565D-05	5.3963D-05	-2.6490D-03	5.5016D-04
9.3067D-04	2.6543D-03	2.8695D-05	-2.4290D-04	2.2054D-03	3.0894D-03
3.7384D-03	8.6124D-05	1.2489D-03	4.1456D-04	2.8092D-03	-6.4652D-04
-5.6518D-04	-2.6961D-03	7.3358D-05	-2.7600D-03	-2.8256D-03	-5.9191D-04
1.8624D-03	1.9426D-03	2.3957D-03	1.2501D-03	-1.9680D-03	3.1689D-03

Columns 7 thru 12

-1.7514D-07	6.1312D-10	8.3324D-08	-1.2064D-08	2.0204D-07	-1.3074D-07
1.8937D-09	4.8250D-08	2.0492D-08	2.7919D-08	9.5281D-09	7.1742D-08
5.9473D-09	5.4734D-07	3.7642D-08	2.5990D-07	1.6965D-08	6.0899D-07
-1.7514D-07	6.1312D-10	8.3324D-08	-1.2064D-08	2.0204D-07	-1.3074D-07
1.8937D-09	4.8250D-08	2.0492D-08	2.7919D-08	9.5281D-09	7.1742D-08
5.9473D-09	5.4734D-07	3.7642D-08	2.5990D-07	1.6965D-08	6.0899D-07
1.5456D-07	-1.1827D-08	7.3872D-09	2.8826D-08	-5.7654D-09	9.5110D-08
-1.5313D-07	1.1139D-07	2.7878D-08	-2.5748D-08	9.6040D-08	-1.2051D-07
-5.2545D-07	-3.2679D-07	-1.7063D-08	-7.6698D-09	-4.7720D-07	-2.6607D-07
1.5456D-07	-1.1827D-08	7.3872D-09	2.8826D-08	-5.7654D-09	9.5110D-08
-1.5313D-07	1.1139D-07	2.7878D-08	-2.5748D-08	9.6040D-08	-1.2051D-07
-5.2545D-07	-3.2679D-07	-1.7063D-08	-7.6698D-09	-4.7720D-07	-2.6607D-07
1.5618D-07	1.6454D-08	4.4857D-08	3.9397D-08	5.0880D-08	9.2538D-08
1.5637D-07	1.1711D-07	8.2433D-09	6.1806D-08	-4.8068D-08	2.1548D-07
5.1575D-07	-3.1846D-07	2.4096D-07	-9.9271D-08	5.4687D-07	-2.9649D-07
1.5618D-07	1.6454D-08	4.4857D-08	3.9397D-08	5.0880D-08	9.2538D-08
1.5637D-07	1.1711D-07	8.2433D-09	6.1806D-08	-4.8068D-08	2.1548D-07
5.1575D-07	-3.1846D-07	2.4096D-07	-9.9271D-08	5.4687D-07	-2.9649D-07
-2.0510D-07	2.9180D-08	-1.1043D-07	-1.4306D-08	-1.9377D-07	-4.2165D-08
1.2828D-07	-1.9517D-07	-1.2404D-08	-9.2393D-08	-4.4477D-08	-1.3859D-07
-4.7846D-08	2.1613D-07	2.7582D-09	1.1685D-07	2.5209D-10	2.2546D-07
-1.4809D-07	3.6969D-08	-1.2755D-07	-6.8359D-09	-2.3348D-07	4.8246D-11
-2.2824D-07	-4.3236D-09	-3.2218D-08	-8.4030D-08	-1.2139D-07	-9.3454D-08
-2.8725D-09	-1.3737D-07	-1.7803D-08	-1.2224D-07	-8.4529D-09	-2.1297D-07
3.8906D-09	1.3295D-07	4.7956D-08	1.2095D-07	2.1648D-08	2.2823D-07
-9.6998D-08	-1.9136D-09	-4.4211D-08	-7.3908D-08	-1.7504D-07	1.7042D-09
-2.0419D-07	-3.7619D-08	-6.0170D-09	-8.5935D-08	-1.2755D-07	-8.2666D-08
-1.3484D-07	-1.9716D-07	-3.1837D-08	-8.5502D-08	1.3625D-08	-2.7173D-07
5.5073D-08	2.1549D-07	8.7422D-08	4.3671D-08	4.6004D-08	2.0266D-07
-1.4772D-07	-4.4930D-08	-1.4553D-08	-9.8996D-08	-1.5997D-07	-5.3617D-08
-1.4349D-07	-2.4415D-08	-5.0467D-09	1.0754D-09	-1.6300D-07	4.1585D-08
-1.1327D-07	-1.8756D-07	3.1005D-09	-6.2015D-09	4.1986D-08	-2.0326D-07
2.1690D-08	1.9303D-07	5.5516D-08	-7.2136D-08	1.4588D-08	1.0430D-07
-2.0359D-07	-4.3671D-08	5.2775D-09	-5.8722D-08	-1.2604D-07	-1.1622D-08
-1.1390D-07	-9.9367D-10	-1.2106D-07	3.4795D-08	-2.7380D-07	9.5729D-08
-2.9560D-09	-2.1417D-07	-1.9741D-08	2.0801D-08	-2.7944D-10	-1.2731D-07
3.0585D-09	2.2769D-07	3.6374D-08	-5.4375D-08	6.7177D-09	1.2077D-07
-2.2624D-07	-3.1021D-09	-1.2314D-07	-2.3764D-08	-2.4239D-07	1.9650D-09
-1.4509D-07	2.2087D-08	-1.4322D-07	4.7084D-08	-2.3676D-07	6.0397D-08

1.0797D-07	-1.8782D-07	-2.0662D-08	-1.2588D-08	-2.8909D-08	-9.5603D-08
-1.6774D-08	1.9623D-07	9.8697D-09	1.1782D-08	-3.2203D-08	1.7315D-07
-2.0532D-07	3.8615D-08	-1.5482D-07	1.6991D-08	-2.2518D-07	1.0483D-08
-1.7542D-07	-3.2170D-09	-1.3276D-07	-4.8150D-08	-2.4069D-07	-3.1783D-08
2.8457D-08	-2.5628D-07	-5.4959D-08	-5.4892D-08	-4.9372D-08	-1.6377D-07
9.4878D-09	2.8466D-07	6.4573D-08	3.3787D-08	3.6078D-08	1.8727D-07
-1.7113D-07	2.5226D-09	-1.4688D-07	-8.2312D-08	-2.6005D-07	-4.7806D-08
5.6081D-08	7.5836D-10	-9.5302D-09	1.6395D-08	-2.8625D-08	4.8198D-08
7.3627D-07	7.9822D-09	1.5519D-07	1.6084D-07	3.2729D-07	2.9647D-07
-5.2192D-07	4.9449D-07	1.6253D-07	-3.3278D-08	3.0320D-07	-2.2921D-08
1.2550D-08	9.3219D-07	-4.3232D-08	2.9960D-07	3.2569D-09	9.2053D-07
-9.3033D-07	-6.1260D-09	-2.4786D-07	4.8774D-08	-9.3941D-07	5.8735D-09
-8.0062D-07	-1.0572D-08	4.0717D-07	-2.6767D-07	1.1146D-06	-1.0269D-06
2.1247D-06	5.2568D-07	-2.7664D-07	6.9844D-07	-1.0527D-06	2.2521D-06
-7.9573D-07	-4.8735D-09	4.0536D-07	-2.6165D-07	1.1034D-06	-1.0137D-06
-2.1228D-06	4.8620D-07	4.2457D-07	-4.7448D-07	1.1143D-06	-1.3874D-06
2.8828D-06	4.2077D-08	-1.9761D-07	7.5744D-07	-7.5703D-07	2.1493D-06
1.7978D-08	4.9923D-07	7.3777D-08	1.1635D-07	3.1502D-08	4.4022D-07
8.8226D-08	4.3923D-08	2.5351D-07	-1.0053D-07	7.4766D-07	-4.0640D-07
-8.0369D-07	5.2418D-07	9.4182D-08	1.2525D-07	4.3656D-07	-1.3466D-07
4.4454D-08	1.7093D-08	7.3887D-07	-4.2534D-07	2.4409D-06	-1.4042D-06
-2.8305D-06	1.6280D-06	4.2589D-07	-1.2860D-07	1.4381D-06	-7.7612D-07
1.7144D-06	3.9523D-08	1.6004D-07	1.5357D-07	9.0331D-08	8.0231D-07
4.3847D-08	7.5509D-07	-4.5647D-08	2.1616D-07	-5.1443D-08	5.2116D-07
5.2939D-06	7.0400D-08	7.3837D-08	7.9828D-07	1.6909D-08	2.8134D-06
7.0777D-08	1.9718D-06	-5.0369D-08	5.3899D-07	-3.7806D-08	1.6518D-06
7.4153D-08	-4.9945D-08	8.5125D-07	-1.1647D-07	1.0393D-06	-4.2939D-07
7.9848D-07	5.3903D-07	-1.1660D-07	9.2803D-07	-4.2852D-07	1.4379D-06
1.7192D-08	-3.7409D-08	1.0398D-06	-4.2830D-07	2.8662D-06	-1.4619D-06
2.8136D-06	1.6518D-06	-4.2974D-07	1.4379D-06	-1.4622D-06	4.3973D-06
-3.3797D-07	-5.8434D-07	-3.1174D-07	-2.8707D-08	-3.9150D-07	-4.2647D-07
3.1899D-07	-5.7733D-07	3.9617D-08	-2.6335D-08	2.9991D-07	-4.4569D-07
5.3164D-07	-1.2194D-08	3.3698D-07	-5.0925D-10	6.7990D-07	-1.6510D-09
1.9085D-07	5.6724D-07	1.6578D-07	2.8139D-07	3.4329D-07	5.6702D-07
-1.7342D-07	5.5527D-07	-7.6711D-09	3.5575D-08	-2.5469D-07	4.7079D-07
-5.3219D-07	-3.4380D-08	-1.8884D-07	-2.5354D-07	-5.8506D-07	-1.1315D-07
-3.2065D-07	-1.1421D-07	-9.2994D-07	-2.6805D-07	-7.4695D-07	-3.1347D-07
6.3541D-10	1.9607D-07	-5.5111D-10	8.0491D-08	9.4982D-09	3.9797D-08
6.5757D-08	2.5826D-06	7.5012D-07	1.2263D-06	7.0379D-07	8.9757D-07
-3.2065D-07	-1.1421D-07	-9.2994D-07	-2.6805D-07	-7.4695D-07	-3.1347D-07
6.3541D-10	1.9607D-07	-5.5111D-10	8.0491D-08	9.4982D-09	3.9797D-08
6.5757D-08	2.5826D-06	7.5012D-07	1.2263D-06	7.0379D-07	8.9757D-07
-5.6706D-09	4.5871D-07	9.8027D-08	2.4387D-07	7.0956D-08	2.2737D-07
9.7612D-08	-5.7199D-07	3.4185D-07	-1.5519D-07	2.5658D-07	-1.6783D-07
-5.3557D-07	-1.3929D-06	-2.9403D-06	-1.4464D-06	-2.2601D-06	-1.2611D-06
-5.6706D-09	4.5871D-07	9.8027D-08	2.4387D-07	7.0956D-08	2.2737D-07
9.7612D-08	-5.7199D-07	3.4185D-07	-1.5519D-07	2.5658D-07	-1.6783D-07
-5.3557D-07	-1.3929D-06	-2.9403D-06	-1.4464D-06	-2.2601D-06	-1.2611D-06
-3.2529D-08	-4.8221D-07	-2.3407D-07	-3.0281D-07	-2.4745D-07	-2.4104D-07
-1.0761D-07	-6.8564D-07	-6.2539D-07	-4.6747D-07	-5.6056D-07	-3.8886D-07
4.1686D-07	-1.1567D-06	1.6844D-06	-1.0338D-07	1.1770D-06	8.4720D-08

-3.2529D-08	-4.8221D-07	-2.3407D-07	-3.0281D-07	-2.4745D-07	-2.4104D-07
-1.0761D-07	-6.8564D-07	-6.2539D-07	-4.6747D-07	-5.6056D-07	-3.8886D-07
4.1686D-07	-1.1567D-06	1.6844D-06	-1.0338D-07	1.1770D-06	8.4720D-08
-2.8364D-07	-1.0377D-06	-1.4996D-06	-9.0618D-07	-1.2797D-06	-8.7209D-07
-2.9713D-07	1.0447D-07	-9.2581D-07	-3.0884D-07	-7.9223D-07	-2.8579D-07
4.1087D-07	-5.0356D-07	1.1666D-06	2.4566D-07	9.8545D-07	2.1755D-07
-3.0910D-07	-1.4515D-06	-1.7479D-06	-1.1512D-06	-1.4823D-06	-1.1011D-06
-4.4080D-07	-7.6050D-08	-1.0386D-06	-3.0499D-07	-8.4566D-07	-3.6453D-07
-2.9191D-08	-7.9265D-07	-3.3830D-07	-4.2022D-07	-2.9647D-07	-3.6671D-07
4.1743D-08	7.8511D-07	4.0937D-07	4.8008D-07	3.4777D-07	4.1575D-07
-4.8775D-07	-1.0031D-07	-1.1792D-06	-3.7176D-07	-9.5042D-07	-3.9769D-07
-1.0753D-07	1.0288D-06	2.7510D-07	5.7920D-07	1.7345D-07	5.3152D-07
2.4847D-07	1.3335D-07	5.6895D-07	1.9262D-07	5.3226D-07	2.2079D-07
-3.7254D-07	-5.7273D-07	-1.0584D-06	-4.8050D-07	-9.5954D-07	-5.1746D-07
-8.4257D-08	1.4530D-06	5.3450D-07	8.5180D-07	4.0034D-07	7.8855D-07
-1.7639D-07	1.3077D-07	-6.5734D-07	-6.9254D-08	-5.6518D-07	-5.8520D-08
-1.8093D-08	-9.1659D-07	-1.4149D-07	-4.8835D-07	-1.2391D-07	-4.9689D-07
-6.7979D-09	9.5796D-07	-1.9850D-08	5.2678D-07	2.7143D-08	4.8195D-07
-1.7326D-07	2.5045D-07	-5.2422D-07	7.6560D-08	-4.4842D-07	4.0980D-08
1.9159D-07	4.8660D-09	6.8914D-07	1.6621D-07	6.0034D-07	1.7852D-07
3.0369D-08	-8.2805D-07	8.5768D-08	-1.6500D-07	3.1409D-08	-2.6779D-07
-3.4842D-08	9.7715D-07	-1.2390D-07	2.1018D-07	-5.5301D-08	3.1251D-07
3.7741D-07	3.2207D-08	1.3309D-06	3.5779D-07	1.1559D-06	3.7015D-07
-2.1013D-07	-2.5545D-07	-9.3775D-07	-3.8212D-07	-7.8616D-07	-3.3590D-07
-2.0635D-08	-9.0179D-07	-4.0100D-07	-4.8768D-07	-4.0038D-07	-4.1572D-07
3.5465D-08	9.4881D-07	4.2659D-07	5.0510D-07	4.0756D-07	4.4245D-07
-2.4023D-07	-3.9543D-07	-1.0622D-06	-4.6898D-07	-8.7369D-07	-4.0888D-07
6.5884D-07	1.5165D-07	2.0994D-06	6.1763D-07	1.7824D-06	6.2205D-07
4.8741D-08	2.1190D-06	7.4399D-07	1.0773D-06	6.8154D-07	1.0355D-06
1.1809D-07	-2.7264D-06	-4.2190D-07	-1.2359D-06	-4.3470D-07	-1.1749D-06
9.5867D-07	-1.2227D-07	3.0064D-06	7.6220D-07	2.5515D-06	7.8068D-07
2.6356D-09	2.9397D-10	7.8053D-09	-2.6064D-08	-6.5815D-09	2.2245D-09
1.0640D-07	7.5105D-09	4.1460D-07	3.6929D-08	1.5705D-07	1.1676D-07
-7.6177D-08	2.8493D-07	1.2839D-08	2.6406D-07	7.3303D-08	-2.4197D-08
1.2682D-07	3.2844D-06	1.2479D-06	1.7027D-06	1.1047D-06	1.3065D-06
-7.1217D-07	-1.5612D-07	-3.4183D-06	-9.9563D-07	-2.5666D-06	-9.9182D-07
-1.5827D-07	4.0575D-09	3.8577D-07	1.1991D-07	2.9493D-07	-1.2896D-07
3.6040D-07	2.5676D-07	7.6416D-09	9.8639D-08	-1.8171D-07	3.6608D-07
-1.6367D-07	-7.7361D-10	2.7356D-07	8.6926D-08	2.1566D-07	-1.4040D-07
-3.6615D-07	3.0860D-07	-1.3257D-07	3.3178D-07	1.3744D-07	-2.9245D-07
4.7646D-07	1.5686D-07	5.0267D-07	1.6808D-08	3.1086D-08	4.9978D-07
2.9719D-08	2.9007D-07	6.3773D-08	2.4046D-07	5.2408D-08	8.1901D-08
-1.7484D-06	1.7390D-06	-7.9332D-06	-1.1811D-06	-5.3237D-06	-2.1036D-06
-1.0804D-07	-5.0265D-06	1.9022D-06	-1.7119D-06	1.0397D-06	-1.2523D-06
-1.3294D-07	1.5392D-06	-2.2306D-06	3.3665D-08	-1.1423D-06	-2.5027D-07
4.1324D-07	6.4472D-07	3.3549D-06	6.3227D-07	2.1733D-06	1.2585D-06
-7.6936D-07	-7.5838D-07	-3.9177D-06	-1.4605D-06	-3.2172D-06	-8.1835D-07
-4.6730D-07	-9.1810D-06	-4.2640D-06	-5.7561D-06	-3.7144D-06	-3.8402D-06
2.8551D-07	7.5887D-08	1.5080D-06	9.1419D-07	1.4657D-06	5.3748D-07
-1.8042D-07	-2.8349D-06	-1.7122D-06	-2.5717D-06	-1.4926D-06	-1.2182D-06
-1.8149D-06	-2.3512D-06	-8.5884D-06	-2.6934D-06	-5.6755D-06	-2.4990D-06

7.6904D-09	-4.5614D-06	-2.8899D-06	-3.3764D-06	-2.3612D-06	-1.9155D-06
-1.5489D-07	-1.7155D-06	-1.7499D-06	-9.4017D-07	-6.5142D-07	-3.9502D-07
-2.8979D-07	8.2494D-07	-9.7713D-07	1.6496D-07	-2.3782D-07	2.1475D-07
2.6966D-07	-5.1545D-07	1.2535D-06	1.7152D-07	1.0908D-06	7.0897D-08
-2.0009D-07	-5.4783D-07	-7.4322D-07	-3.8218D-07	-7.4814D-07	-3.4798D-07
1.0407D-07	1.5133D-06	1.2728D-06	1.0560D-06	1.0787D-06	9.2968D-07
5.7787D-07	-2.7843D-07	1.4817D-06	4.4605D-07	1.1876D-06	4.6445D-07
-4.7548D-07	-3.2919D-07	-8.6924D-07	-1.9599D-07	-7.6062D-07	-3.6158D-07
1.2139D-07	1.5348D-06	9.9335D-07	1.0842D-06	7.9307D-07	1.1008D-06
6.1088D-03	-3.3189D-05	-1.1847D-05	-7.4093D-04	-1.0304D-03	-7.8556D-04
-8.3432D-05	2.2032D-03	1.5321D-04	-2.9719D-04	-3.5227D-04	-3.6489D-04
-8.0024D-05	-3.8633D-03	7.5012D-04	-7.3502D-04	-3.8583D-04	-3.1941D-03
6.1088D-03	-3.3189D-05	-1.1847D-05	-7.4093D-04	-1.0304D-03	-7.8556D-04
-8.3432D-05	2.2032D-03	1.5321D-04	-2.9719D-04	-3.5227D-04	-3.6489D-04
-8.0024D-05	-3.8633D-03	7.5012D-04	-7.3502D-04	-3.8583D-04	-3.1941D-03
6.2507D-05	1.8559D-04	-1.9981D-03	2.7503D-05	3.1145D-03	-1.6358D-03
-2.3116D-04	-1.3049D-03	9.3283D-05	-2.3052D-03	-1.6785D-03	5.2058D-03
2.4870D-03	1.8597D-03	-3.4490D-03	-1.8495D-03	3.3660D-03	1.8393D-03
6.2507D-05	1.8559D-04	-1.9981D-03	2.7503D-05	3.1145D-03	-1.6358D-03
-2.3116D-04	-1.3049D-03	9.3283D-05	-2.3052D-03	-1.6785D-03	5.2058D-03
2.4870D-03	1.8597D-03	-3.4490D-03	-1.8495D-03	3.3660D-03	1.8393D-03
-4.7682D-05	-2.0928D-04	-5.1965D-04	5.3620D-04	-9.6268D-04	-3.7132D-04
2.2309D-04	-1.3541D-03	-5.0528D-04	2.1558D-04	-7.9313D-04	-2.5202D-04
-2.5678D-03	1.9180D-03	1.7915D-04	1.0819D-03	-2.7854D-03	1.2627D-03
-4.7682D-05	-2.0928D-04	-5.1965D-04	5.3620D-04	-9.6268D-04	-3.7132D-04
2.2309D-04	-1.3541D-03	-5.0528D-04	2.1558D-04	-7.9313D-04	-2.5202D-04
-2.5678D-03	1.9180D-03	1.7915D-04	1.0819D-03	-2.7854D-03	1.2627D-03
-9.8249D-04	-1.9188D-03	1.0314D-03	-4.3353D-04	4.3170D-04	-6.6399D-04
-8.3677D-04	1.1303D-04	-5.8705D-04	1.5695D-03	-6.9904D-04	1.2134D-03
1.6073D-03	-2.1242D-04	1.0246D-03	-1.7748D-03	6.2060D-04	-1.3652D-03
-4.2121D-04	-1.7803D-03	8.7018D-04	-7.9942D-04	7.0824D-04	-5.3499D-04
7.6139D-05	8.8820D-05	-7.3837D-04	1.1122D-03	-9.3559D-04	2.6460D-04
-1.5811D-05	-1.3717D-03	6.8750D-04	1.5454D-03	-3.2597D-05	1.2967D-03
3.6462D-05	3.8082D-03	-1.4254D-03	-1.8004D-03	-6.5358D-05	-1.4076D-03
3.3920D-03	2.3835D-05	-1.1455D-03	1.2691D-03	-9.1538D-04	6.5172D-04
-1.0637D-03	1.9372D-03	-1.6249D-03	1.0529D-03	-1.4538D-03	5.7027D-04
8.6969D-04	1.3535D-04	1.3837D-03	-9.1834D-05	1.7533D-03	4.9018D-04
-1.6190D-03	-2.0983D-04	-3.2435D-03	1.1934D-03	-1.2612D-03	-1.2030D-03
-4.6909D-04	1.7724D-03	-1.8645D-03	1.2157D-03	-1.5430D-03	9.7549D-04
6.1099D-04	7.9968D-04	-7.1986D-04	-1.4807D-03	-1.0079D-03	-5.9936D-04
1.1784D-03	-3.4262D-04	-1.5243D-03	1.1209D-03	-7.0151D-04	-2.9329D-04
-1.4188D-03	1.0979D-04	-1.7760D-04	9.4092D-04	3.1528D-03	-1.6063D-03
5.0299D-04	7.8867D-04	-6.7002D-04	4.0164D-04	-2.0581D-03	-3.1127D-03
1.6225D-03	2.5575D-05	6.5811D-04	3.3854D-05	1.0418D-03	3.4661D-04
-1.0174D-05	-1.0219D-04	-2.4878D-04	-1.9290D-03	-7.9656D-04	-2.0137D-03
3.5108D-05	-2.1190D-04	2.5040D-04	3.2737D-03	7.2559D-04	1.8253D-03
1.7100D-03	4.6065D-05	7.6817D-04	1.7471D-03	1.5033D-03	-4.9423D-04
6.5993D-04	-8.5050D-04	1.6799D-03	-6.5659D-04	7.5062D-04	-1.0817D-03
-1.1773D-03	-2.9642D-04	-2.9649D-04	-7.6124D-04	-7.0631D-04	-4.8075D-04
1.4852D-03	5.6021D-05	6.8054D-04	1.4309D-03	4.9990D-04	6.1661D-04
5.5058D-04	-8.4631D-04	2.2378D-03	-4.5827D-04	1.0118D-03	-1.1041D-03

6.6066D-05	1.2808D-05	2.2767D-03	1.1655D-03	1.7068D-03	8.6663D-04
1.6597D-04	2.1903D-03	1.2182D-03	5.3313D-04	8.3196D-04	6.1857D-04
-1.3790D-04	-2.8964D-03	-1.0195D-03	2.1193D-04	-9.4833D-04	-5.6236D-04
1.6733D-04	-2.9353D-05	2.5290D-03	1.7365D-03	2.2603D-03	1.2334D-03
1.7325D-04	1.8039D-06	-1.7022D-06	-1.8447D-05	-9.0111D-05	1.5196D-04
-9.0422D-06	-4.7828D-05	-9.4622D-04	-7.9560D-04	3.4884D-04	-4.4324D-04
7.0109D-04	8.2804D-06	-7.4130D-04	-7.4289D-05	-4.0473D-04	8.4656D-04
2.6331D-04	-6.8793D-03	2.1410D-03	6.4062D-04	-1.1110D-03	-5.1360D-03
4.7495D-03	-6.7680D-05	-3.6384D-03	-2.3669D-03	6.1969D-03	1.1312D-03
1.8127D-03	1.4883D-05	-1.6570D-03	8.9256D-04	-6.6962D-04	1.0076D-03
-3.0796D-03	-2.9745D-04	6.6382D-04	-2.7121D-03	1.2244D-03	-2.0378D-03
1.8205D-03	-3.4794D-05	-1.6325D-03	6.6070D-04	-1.0642D-03	1.4117D-03
2.7203D-03	-8.1214D-05	-1.5104D-03	1.5663D-03	-1.7043D-03	2.6247D-03
-2.6731D-03	-9.6430D-05	3.7209D-04	-2.9673D-03	1.5840D-03	-2.8594D-03
1.4872D-04	-8.1899D-05	-4.2409D-04	-5.9195D-04	-1.2503D-04	1.9315D-04
-9.3370D-04	-2.5803D-03	-5.4587D-03	1.5115D-03	1.8378D-03	5.6655D-05
-1.6199D-03	9.9941D-04	-9.9727D-04	-5.2083D-03	-1.1296D-03	-2.0324D-03
-2.5243D-03	-2.0239D-03	2.5292D-03	9.0381D-04	-7.1796D-03	4.9096D-03
7.5643D-03	-5.7586D-03	-3.8339D-04	-2.3514D-03	-4.8647D-03	-1.0602D-03
2.5832D-03	-1.1998D-03	-5.4499D-03	-1.4475D-03	-1.3844D-03	1.3507D-03
-1.2700D-03	1.0388D-04	1.2520D-03	-5.0480D-03	2.6562D-03	1.5358D-03
-4.4875D-02	2.8473D-04	-6.1153D-04	1.3549D-03	-2.5975D-03	-7.6036D-03
2.7875D-04	-2.3952D-02	2.6607D-03	4.9186D-04	2.2417D-03	-5.6020D-03
-6.3626D-04	2.6331D-03	-2.0288D-02	5.7386D-04	-7.8045D-04	-7.0492D-04
1.3428D-03	4.6744D-04	5.7326D-04	-2.0150D-02	-6.4601D-04	2.9163D-03
-2.6123D-03	2.2266D-03	-7.5888D-04	-6.3672D-04	-2.9244D-02	8.6611D-03
-7.6108D-03	-5.5918D-03	-6.8913D-04	2.9316D-03	8.6661D-03	-3.9965D-02
2.3232D-03	1.4292D-03	1.8183D-03	-2.2101D-03	-2.6292D-04	6.0988D-05
-2.3137D-03	1.3866D-03	-1.8678D-03	-3.3098D-03	-2.9687D-04	-1.3613D-03
1.0912D-03	7.6756D-04	-2.1532D-03	1.7904D-03	-2.4964D-03	1.2185D-03
-4.7111D-05	-5.2490D-05	7.1960D-04	-2.6444D-03	-1.5974D-04	-2.7573D-03
1.7621D-04	8.3443D-05	-3.8737D-03	3.0122D-04	-1.3099D-03	5.4477D-04
-1.0291D-03	8.5407D-04	-9.9956D-04	2.7008D-03	-6.1309D-05	-1.0109D-04

Columns 13 thru 18

-2.2443D-08	2.3051D-08	7.1852D-08	4.0910D-08	-4.0763D-08	-7.2749D-08
-3.2332D-08	-3.2208D-08	-4.1393D-09	2.0149D-08	2.0412D-08	-3.9469D-09
-1.5581D-07	-1.5630D-07	-4.5447D-08	1.3165D-07	1.3381D-07	-4.3166D-08
-2.2443D-08	2.3051D-08	7.1852D-08	4.0910D-08	-4.0763D-08	-7.2749D-08
-3.2332D-08	-3.2208D-08	-4.1393D-09	2.0149D-08	2.0412D-08	-3.9469D-09
-1.5581D-07	-1.5630D-07	-4.5447D-08	1.3165D-07	1.3381D-07	-4.3166D-08
2.5265D-09	3.9483D-08	3.9077D-08	1.6485D-08	-3.2232D-08	-3.7783D-08
-4.5383D-08	-6.0616D-08	-3.1427D-09	3.5836D-08	6.3936D-08	2.5119D-08
1.3367D-07	-4.3074D-08	-1.5551D-07	-1.5590D-07	-4.5133D-08	1.3161D-07
2.5265D-09	3.9483D-08	3.9077D-08	1.6485D-08	-3.2232D-08	-3.7783D-08
-4.5383D-08	-6.0616D-08	-3.1427D-09	3.5836D-08	6.3936D-08	2.5119D-08
1.3367D-07	-4.3074D-08	-1.5551D-07	-1.5590D-07	-4.5133D-08	1.3161D-07
-3.9437D-08	-3.1277D-09	3.7843D-08	3.2835D-08	-1.6636D-08	-3.9247D-08
-6.0092D-08	-4.5748D-08	2.4672D-08	6.4725D-08	3.5755D-08	-3.5255D-09
-4.5595D-08	1.3160D-07	1.3371D-07	-4.3079D-08	-1.5566D-07	-1.5625D-07
-3.9437D-08	-3.1277D-09	3.7843D-08	3.2835D-08	-1.6636D-08	-3.9247D-08

-6.0092D-08	-4.5748D-08	2.4672D-08	6.4725D-08	3.5755D-08	-3.5255D-09
-4.5595D-08	1.3160D-07	1.3371D-07	-4.3079D-08	-1.5566D-07	-1.5625D-07
6.5594D-08	-1.8580D-08	-1.7673D-07	-9.6201D-08	5.5318D-08	9.6220D-08
7.3940D-08	7.3683D-08	-9.0849D-09	-1.4866D-07	-5.3295D-08	1.8982D-08
-9.7680D-08	-1.0016D-07	2.0082D-08	1.8134D-07	6.4475D-08	-1.2525D-08
7.1324D-08	-1.6476D-08	-2.2095D-07	-1.2787D-07	7.9393D-08	1.1970D-07
3.1381D-08	-3.1675D-08	-1.2312D-07	-1.1002D-07	1.0980D-07	1.2193D-07
4.4959D-08	4.4439D-08	2.1646D-08	-5.1065D-08	-5.1332D-08	2.0780D-08
-7.5284D-08	-7.4386D-08	-8.6335D-09	7.7488D-08	7.7545D-08	-7.7393D-09
2.7584D-08	-2.8488D-08	-1.4232D-07	-1.4804D-07	1.4781D-07	1.4056D-07
1.8630D-08	-6.5184D-08	-9.6707D-08	-5.4384D-08	9.5421D-08	1.7668D-07
7.4622D-08	7.4501D-08	2.0145D-08	-5.3011D-08	-1.4828D-07	-8.8792D-09
-1.0100D-07	-9.8032D-08	-1.3758D-08	6.4286D-08	1.8073D-07	1.9660D-08
1.6290D-08	-7.1482D-08	-1.2034D-07	-7.8256D-08	1.2710D-07	2.2089D-07
-1.0528D-08	-7.9410D-08	-5.4703D-08	-2.2554D-08	4.2687D-08	9.9181D-08
1.2085D-07	9.5408D-08	4.6879D-09	-4.9744D-08	-1.1764D-07	-6.9936D-08
-1.6682D-07	-1.1777D-07	1.3868D-08	6.1865D-08	1.2755D-07	8.9532D-08
-6.6741D-09	-7.7327D-08	-7.8998D-08	-5.0142D-08	6.3346D-08	1.4097D-07
8.0633D-08	-8.0746D-08	-7.3903D-08	-3.1729D-08	3.1406D-08	7.3486D-08
1.5688D-07	1.5698D-07	-2.1331D-08	-9.3558D-08	-9.4335D-08	-2.0818D-08
-2.0053D-07	-2.0063D-07	3.6541D-08	1.1076D-07	1.1164D-07	3.5858D-08
9.3088D-08	-9.3043D-08	-9.5312D-08	-4.8978D-08	4.8745D-08	9.5180D-08
8.0334D-08	1.0765D-08	-9.9742D-08	-4.3051D-08	2.3365D-08	5.4258D-08
9.5593D-08	1.2048D-07	-6.9758D-08	-1.1641D-07	-4.9745D-08	5.1448D-09
-1.1860D-07	-1.6670D-07	8.9287D-08	1.2586D-07	6.1701D-08	1.2714D-08
7.8628D-08	7.0411D-09	-1.4141D-07	-6.3595D-08	5.1560D-08	7.8460D-08
4.0271D-08	-4.0630D-08	-1.0513D-07	-6.5421D-08	6.5239D-08	1.0650D-07
1.0063D-07	9.7077D-08	-1.2199D-08	-8.6788D-08	-8.1972D-08	-1.6068D-08
-1.3627D-07	-1.3480D-07	2.7170D-08	9.9709D-08	1.1051D-07	3.6250D-08
3.7560D-08	-4.6221D-08	-1.3217D-07	-9.2284D-08	9.9041D-08	1.4379D-07
3.4386D-09	-3.5664D-09	3.3222D-09	-3.5969D-09	3.4617D-09	-3.4953D-09
-1.0239D-07	1.0346D-07	2.8989D-07	1.7323D-07	-1.7511D-07	-2.8954D-07
-2.7549D-07	-2.5949D-07	3.5209D-08	2.3365D-07	2.1875D-07	4.6546D-08
-2.5715D-07	-2.5714D-07	-1.2760D-08	2.7044D-07	2.7103D-07	-1.4266D-08
1.6497D-07	-1.6414D-07	-3.0552D-07	-1.4130D-07	1.4137D-07	3.0462D-07
-1.2271D-07	1.2620D-07	2.7100D-07	1.9399D-07	-1.9829D-07	-2.7189D-07
-2.3693D-07	-2.9642D-07	6.2791D-08	1.9350D-07	2.5807D-07	1.9744D-08
-1.2419D-07	1.1997D-07	2.6795D-07	1.9327D-07	-1.9164D-07	-2.6634D-07
-3.0064D-07	-2.4269D-07	1.4622D-08	2.5758D-07	2.0046D-07	6.8778D-08
-7.8199D-08	7.0122D-08	3.1941D-07	1.5007D-07	-1.4347D-07	-3.1719D-07
-2.6624D-07	-2.6497D-07	4.2538D-08	2.2528D-07	2.2466D-07	3.8617D-08
-2.5684D-08	3.1717D-07	1.8306D-07	4.8222D-09	-1.6603D-07	-3.2523D-07
-2.4646D-08	-3.6594D-08	-2.5463D-07	4.6869D-08	2.9011D-07	1.7782D-09
-2.7904D-07	3.9513D-07	5.6898D-07	2.3771D-07	-3.3743D-07	-6.6257D-07
-4.5542D-07	-4.4738D-07	-1.2247D-07	4.8238D-07	5.8550D-07	1.0780D-08
-1.6796D-07	1.6117D-07	3.3907D-08	-1.2576D-07	1.3088D-07	-4.1563D-08
-2.8829D-07	-2.8071D-07	-8.4684D-09	2.9420D-07	2.8707D-07	-1.8797D-08
-3.3812D-07	3.1916D-07	5.3165D-07	1.9079D-07	-1.7338D-07	-5.3221D-07
-5.8441D-07	-5.7747D-07	-1.2362D-08	5.6720D-07	5.5516D-07	-3.4581D-08
-3.1199D-07	3.9475D-08	3.3690D-07	1.6554D-07	-7.7558D-09	-1.8892D-07
-2.8768D-08	-2.6445D-08	-6.7321D-10	2.8134D-07	3.5459D-08	-2.5371D-07

-3.9174D-07	2.9984D-07	6.7991D-07	3.4310D-07	-2.5474D-07	-5.3522D-07
-4.2657D-07	-4.4576D-07	-1.3314D-09	5.6708D-07	4.7078D-07	-1.1329D-07
5.2611D-07	3.0094D-07	-2.1055D-07	-3.2948D-07	-2.1087D-07	5.0508D-08
3.0093D-07	5.2586D-07	5.0283D-08	-2.0917D-07	-3.2991D-07	-2.0933D-07
-2.1065D-07	5.0275D-08	5.2681D-07	3.0165D-07	-2.1072D-07	-3.2904D-07
-3.2951D-07	-2.0912D-07	3.0164D-07	5.2670D-07	5.0516D-08	-2.0867D-07
-2.1081D-07	-3.2992D-07	-2.1080D-07	5.0524D-08	5.2617D-07	3.0109D-07
5.0492D-08	-2.0940D-07	-3.2901D-07	-2.0856D-07	3.0111D-07	5.2656D-07
-1.0391D-07	1.0789D-07	1.6815D-09	-9.8573D-08	1.0818D-07	5.7560D-09
-9.3780D-09	-9.7573D-09	1.6945D-09	-8.8354D-09	-9.9619D-09	1.1976D-09
-1.2888D-07	-1.7174D-07	2.2516D-07	-1.0689D-07	-1.5555D-07	2.1422D-07
-1.0391D-07	1.0789D-07	1.6815D-09	-9.8573D-08	1.0818D-07	5.7560D-09
-9.3780D-09	-9.7573D-09	1.6945D-09	-8.8354D-09	-9.9619D-09	1.1976D-09
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-4.8009D-08	-1.9442D-08	5.8462D-08	-4.8282D-08	-1.7196D-08	5.5136D-08
8.6840D-08	-4.3024D-09	-9.4222D-08	8.6422D-08	-6.0511D-09	-9.2657D-08
-8.4947D-08	3.1597D-07	-7.9391D-08	-9.9576D-08	3.2218D-07	-5.1444D-08
-4.8009D-08	-1.9442D-08	5.8462D-08	-4.8282D-08	-1.7196D-08	5.5136D-08
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-7.5999D-09	9.4640D-08	-8.4910D-08	-9.5636D-09	9.8913D-08	-8.6707D-08
2.6314D-07	-6.6812D-08	-1.2657D-07	2.5154D-07	-9.0276D-08	-1.4178D-07
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-2.2780D-08	2.6783D-07	-1.8883D-07	-5.3552D-08	2.7022D-07	-1.7340D-07
-1.4153D-07	1.4230D-07	2.4195D-08	-1.4161D-07	1.5378D-07	4.6488D-08
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-1.6335D-07	1.5251D-07	-2.2188D-08	-1.5096D-07	1.4744D-07	2.0217D-08
6.0039D-08	8.3356D-08	-8.9369D-08	5.7051D-08	8.3262D-08	-8.6631D-08
-7.0319D-08	-1.0336D-07	8.0962D-08	-6.5828D-08	-1.0226D-07	7.7652D-08
-1.6195D-07	1.5880D-07	-1.9201D-08	-1.5620D-07	1.5958D-07	2.1693D-08
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1.4474D-07	-9.9724D-08	5.4311D-08	1.4295D-07	-1.0268D-07	3.1425D-08
-1.7838D-07	1.8514D-07	-1.4057D-07	-1.7302D-07	1.8207D-07	-1.0278D-07
-2.4852D-07	-1.2439D-07	2.4423D-07	-2.2956D-07	-8.7082D-08	2.5240D-07
-1.2736D-07	4.4311D-08	3.7344D-08	-1.2692D-07	6.7170D-08	3.3852D-08
8.5193D-08	5.9669D-08	-1.7257D-07	9.0838D-08	2.4302D-08	-1.6324D-07
-8.8964D-08	-4.6780D-08	1.7362D-07	-8.9868D-08	-1.2511D-08	1.6910D-07
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-6.4706D-08	-3.2868D-08	2.6815D-07	-4.8761D-08	-1.4987D-09	2.6392D-07
2.1149D-07	-1.8299D-07	2.7404D-09	2.2881D-07	-2.1451D-07	-4.8968D-09
-6.3299D-08	1.3697D-07	-2.5003D-08	-8.2221D-08	1.4528D-07	-2.7616D-08
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-3.4753D-08	-9.4474D-08	1.6485D-07	-5.6107D-09	-9.3960D-08	1.6344D-07
-4.4297D-08	1.6341D-07	-2.6847D-08	-6.4636D-08	1.6924D-07	-2.5495D-08
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-3.5175D-08	8.6596D-09	-8.3257D-09	-4.7074D-08	2.2119D-08	-3.1349D-08
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-6.7313D-08	4.9673D-08	-4.7691D-08	-1.0948D-08	-9.7915D-09	3.0918D-09
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9.3613D-09	-5.5714D-08	5.3071D-08	-1.0100D-07	6.3151D-08	-6.9816D-08
-8.1510D-09	-1.6702D-08	-5.4502D-08	-3.4259D-09	-9.4438D-09	-6.0624D-08
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3.8947D-07	1.8557D-07	-1.6767D-07	5.0815D-07	6.2407D-08	-2.1699D-07
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2.1683D-07	-2.3289D-07	-5.9965D-08	2.1672D-07	-2.3882D-07	-1.2110D-07
-2.2317D-07	1.5135D-07	-1.2704D-07	-2.1367D-07	1.5808D-07	-7.0106D-08
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-5.7768D-05	-9.9783D-04	8.4490D-04	-5.9142D-04	1.0242D-04	6.2973D-05
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1.4234D-04	-1.3378D-04	-2.0953D-04	7.7472D-04	-7.5393D-04	2.5113D-04
-4.1660D-04	-3.8389D-04	-2.9977D-04	2.4894D-04	2.4803D-04	-2.7466D-04
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1.3555D-04	-8.8954D-05	-2.6614D-05	1.7776D-04	2.5098D-03	-1.5102D-03
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1.6616D-04	1.3068D-04	2.8882D-04	3.9671D-04	3.7428D-04	-6.0121D-04
-7.8030D-04	3.5179D-04	3.3175D-04	7.5611D-05	-3.2251D-05	5.4840D-04
1.7336D-03	-3.2002D-04	-3.5591D-04	-2.2376D-05	-1.5855D-05	-9.1481D-04
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-1.7616D-04	-4.8564D-05	1.5040D-03	-3.3267D-04	-4.2816D-04	-2.0630D-04
1.5435D-04	-1.3695D-04	-1.7748D-04	1.3362D-06	-5.0979D-07	1.0586D-04
2.7160D-05	1.2369D-04	1.1263D-05	-9.0249D-05	-2.4922D-04	1.3237D-04
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-1.8056D-04	-2.6323D-04	1.6648D-04	2.5753D-04	-4.1797D-04	-4.1353D-04
-1.0203D-04	1.0719D-04	-1.0379D-04	1.1423D-04	-1.0026D-04	1.1154D-04
3.7544D-04	-3.6032D-04	-1.2693D-03	-7.3909D-04	7.2777D-04	1.2813D-03
1.2703D-03	1.0737D-03	-9.8877D-05	-1.0166D-03	-8.5072D-04	-3.0224D-04
7.4265D-05	1.4887D-04	-4.3130D-04	3.4843D-04	3.2746D-04	-4.2967D-04
4.2506D-04	-4.5197D-04	-1.5156D-04	3.3530D-04	-3.2686D-04	1.3938D-04
6.5245D-04	-6.1132D-04	-9.6238D-04	-1.0118D-03	1.0545D-03	1.0229D-03
7.9889D-04	1.5143D-03	-5.8511D-04	-5.5549D-04	-1.3491D-03	1.1434D-04
6.4910D-04	-5.9425D-04	-1.0093D-03	-9.8905D-04	1.0040D-03	1.0043D-03
1.5939D-03	8.2692D-04	1.7132D-04	-1.2764D-03	-5.3240D-04	-5.9738D-04
-3.3074D-05	3.6161D-05	-1.6868D-03	-4.0928D-04	3.6966D-04	1.6246D-03
1.1413D-03	1.1705D-03	-2.2303D-04	-9.2234D-04	-9.5430D-04	-2.1193D-04
1.6186D-03	-1.9540D-03	9.3085D-04	3.7307D-03	-5.5604D-04	1.8672D-03
-3.4740D-03	-2.1928D-03	2.6506D-03	9.2166D-05	-2.6942D-03	1.9378D-03
1.3079D-04	2.3599D-05	2.9040D-05	1.2424D-03	7.8705D-05	2.3988D-03
-1.3976D-03	5.3152D-05	-2.4443D-04	4.1823D-04	-2.7624D-03	1.2472D-03
2.6021D-03	-2.6429D-03	2.2031D-03	2.8078D-03	-2.8193D-03	-1.9682D-03
8.5787D-04	5.7291D-04	3.0764D-03	-6.4130D-04	-5.7489D-04	3.1582D-03
2.3228D-03	-2.3123D-03	1.0898D-03	-4.7723D-05	1.7726D-04	-1.0298D-03
1.4382D-03	1.4008D-03	7.5718D-04	-4.8882D-05	9.3671D-05	8.4519D-04
1.8188D-03	-1.8484D-03	-2.1606D-03	7.1452D-04	-3.8545D-03	-1.0010D-03
-2.2057D-03	-3.2965D-03	1.7849D-03	-2.6445D-03	3.1245D-04	2.6975D-03
-2.6238D-04	-2.8347D-04	-2.5026D-03	-1.6334D-04	-1.2969D-03	-6.3950D-05
6.2054D-05	-1.3538D-03	1.2139D-03	-2.7585D-03	5.5130D-04	-1.0356D-04
-6.7421D-03	-1.1003D-03	5.0752D-04	4.7014D-04	5.2272D-04	2.9676D-04

-1.1004D-03	-6.7699D-03	3.1525D-04	4.6746D-04	4.8247D-04	4.7363D-04
5.0744D-04	3.1456D-04	-6.7701D-03	-1.1104D-03	5.2329D-04	4.5876D-04
4.6999D-04	4.6728D-04	-1.1105D-03	-6.7987D-03	3.1772D-04	4.4807D-04
5.2250D-04	4.8231D-04	5.2400D-04	3.1783D-04	-6.7379D-03	-1.0954D-03
2.9670D-04	4.7303D-04	4.5879D-04	4.4811D-04	-1.0960D-03	-6.8086D-03

D[illegible] =

Columns 1 thru 6

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-1.3878D-10	1.3728D-07	-5.3307D-08	-3.4115D-08	3.2144D-07	-3.4323D-08
-8.7436D-08	-1.2289D-07	2.8271D-08	-1.4752D-08	-3.8960D-10	1.5510D-08
9.9568D-11	2.4752D-08	2.6112D-10	4.0841D-09	4.4563D-08	4.1297D-09
-1.3878D-10	1.3728D-07	-5.3307D-08	-3.4115D-08	3.2144D-07	-3.4323D-08
1.0267D-07	4.8273D-08	1.3585D-08	-3.8271D-08	-1.1188D-08	3.6892D-09
-1.3289D-07	-5.8876D-08	-2.4362D-08	-2.2667D-08	1.1119D-08	-1.4449D-08
-1.2430D-07	-6.8730D-08	-5.1821D-08	3.2095D-07	-3.4108D-08	-3.4576D-08
1.0267D-07	4.8273D-08	1.3585D-08	-3.8271D-08	-1.1188D-08	3.6892D-09
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-1.2430D-07	-6.8730D-08	-5.1821D-08	3.2095D-07	-3.4108D-08	-3.4576D-08
1.0230D-07	7.1303D-08	3.7372D-08	-3.9865D-09	1.0886D-08	3.8705D-08
1.3474D-07	1.5055D-07	-2.1060D-08	-1.5119D-08	1.0784D-08	-2.2117D-08
1.1735D-07	-7.5260D-08	3.5455D-07	-3.4578D-08	-3.4318D-08	3.2143D-07
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-1.4178D-07	-5.7395D-08	-7.1035D-08	4.9045D-08	2.4179D-10	-5.5310D-08
6.6604D-08	3.4678D-09	3.8841D-08	2.8443D-08	-6.3342D-08	3.1297D-08
5.8393D-09	7.2863D-08	-3.7785D-08	-2.5901D-08	5.6996D-08	-2.9494D-08
-1.1768D-07	-2.2984D-08	-6.8965D-08	4.4309D-08	1.9332D-09	-4.9315D-08
-1.4417D-07	-4.3024D-08	-5.8395D-08	3.9937D-08	5.3592D-10	-4.0063D-08
-5.3421D-10	-4.7262D-08	1.7521D-08	1.1350D-08	-9.5618D-08	1.1741D-08
1.0506D-09	6.8729D-08	-1.7256D-08	-8.7560D-09	9.5481D-08	-8.9559D-09
-4.6902D-08	5.0912D-08	-4.9188D-08	2.6502D-08	6.7217D-10	-2.6965D-08
-1.4040D-07	-2.3043D-08	-6.7894D-08	5.5027D-08	3.6997D-10	-4.9204D-08
-6.8599D-08	-1.4530D-07	3.9027D-08	3.1565D-08	-6.3647D-08	2.8450D-08
-3.7812D-09	9.9460D-08	-3.8740D-08	-2.9818D-08	5.7415D-08	-2.5460D-08
-1.1594D-07	1.4002D-08	-6.7790D-08	4.8742D-08	-1.0364D-09	-4.4811D-08
-3.2501D-08	4.2452D-08	-4.3693D-08	8.2580D-08	9.9449D-09	-2.9947D-08
-2.8119D-08	-1.2019D-07	4.2558D-08	4.8214D-08	-4.0690D-08	2.9002D-08
-6.1891D-08	5.3045D-08	-3.4895D-08	-4.8319D-08	2.7801D-08	-1.8463D-08
-1.0624D-07	-8.2752D-09	-3.9108D-08	8.2377D-08	5.6363D-09	-2.0920D-08
3.7742D-08	8.5917D-08	-6.8570D-08	5.4909D-08	1.2247D-10	-5.5182D-08
-1.9592D-09	-1.0082D-07	4.2338D-08	3.2523D-08	-5.7084D-08	3.1624D-08
2.2033D-09	1.1831D-07	-4.0764D-08	-2.8264D-08	5.1814D-08	-2.7019D-08
-5.8641D-08	1.5259D-08	-6.6933D-08	5.0099D-08	3.1693D-10	-5.0379D-08
-3.2766D-08	5.6050D-09	-9.3454D-08	3.0285D-08	-1.0020D-08	-8.3157D-08
2.4797D-08	-4.0565D-08	5.3660D-08	2.8952D-08	-4.0343D-08	4.7266D-08
6.5242D-08	1.3619D-07	-5.3717D-08	-1.8775D-08	2.7438D-08	-4.7251D-08
-1.0618D-07	-3.6812D-08	-9.4493D-08	2.1142D-08	-5.4401D-09	-8.3019D-08

-7.9893D-08	1.1837D-09	-6.2923D-08	4.5268D-08	3.0947D-10	-4.5844D-08
2.8265D-08	-5.4868D-08	3.5806D-08	2.6617D-08	-5.2672D-08	2.5768D-08
-3.2749D-09	9.7724D-08	-3.1426D-08	-2.3549D-08	4.3924D-08	-1.9164D-08
-9.7601D-08	4.8004D-09	-5.6960D-08	3.8545D-08	3.4481D-10	-3.5853D-08
4.9010D-08	4.2232D-08	8.5130D-11	3.6293D-11	1.0574D-11	-9.0431D-11
4.5219D-07	2.0723D-07	1.6471D-07	-1.2024D-07	-2.4186D-09	1.2205D-07
-4.1089D-07	-1.5399D-07	-9.3650D-08	-7.1021D-08	1.4043D-07	-6.7421D-08
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-2.4498D-07	5.1749D-09	-3.6120D-07	3.0619D-07	1.1601D-09	-3.0709D-07
-7.4948D-07	-8.2983D-07	1.6562D-07	-1.2198D-07	-1.6075D-09	1.2624D-07
1.6509D-06	1.6257D-06	-9.5791D-08	-6.8768D-08	1.3730D-07	-7.5250D-08
-7.4133D-07	-8.1663D-07	1.6126D-07	-1.1870D-07	9.2404D-10	1.2284D-07
-1.6570D-06	-1.2236D-06	-9.8440D-08	-7.1069D-08	1.4485D-07	-6.7835D-08
2.1246D-06	1.6509D-06	1.6535D-07	-1.2434D-07	-9.6846D-11	1.1735D-07
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-1.8439D-07	-4.1145D-07	5.7811D-08	-2.4391D-07	-3.4878D-08	1.4922D-08
-7.6828D-07	-4.7797D-07	-3.9657D-08	-9.7982D-08	2.5826D-07	-9.1783D-09
-7.2113D-07	-1.0790D-06	5.9267D-07	-5.3675D-07	-1.7781D-08	4.7135D-07
-2.1780D-06	-1.3993D-06	-3.5630D-07	-2.9091D-07	6.1958D-07	-2.7502D-07
8.6611D-07	6.8572D-07	2.1864D-07	-2.0578D-07	1.6891D-09	2.0538D-07
1.5612D-08	2.5664D-07	-1.8967D-07	-1.6169D-07	1.9230D-08	-1.6171D-07
2.8830D-06	2.1249D-06	6.1296D-07	-5.2553D-07	6.0293D-09	5.1574D-07
4.2297D-08	5.2589D-07	-3.7685D-07	-3.2680D-07	5.4732D-07	-3.1838D-07
-1 9734D-07	-2.7644D-07	2.7008D-07	-1.6930D-08	3.7627D-08	2.4093D-07
7.5758D-07	6.9861D-07	-9.2507D-08	-7.6213D-09	2.5993D-07	-9.9268D-08
-7.5690D-07	-1.0527D-06	6.4210D-07	-4.7706D-07	1.6941D-08	5.4682D-07
2.1496D-06	2.2524D-06	-3.4443D-07	-2.6609D-07	6.0905D-07	-2.9648D-07
-7.8174D-08	-2.3695D-07	-3.1746D-08	1.3367D-07	-1.5582D-07	-4.5593D-08
7.0055D-08	-2.9649D-07	1.8767D-07	-4.3025D-08	-1.5633D-07	1.3158D-07
3.1944D-07	6.2833D-08	1.8917D-07	-1.5550D-07	-4.5436D-08	1.3370D-07
1.5006D-07	1.9347D-07	-3.1699D-08	-1.5587D-07	1.3162D-07	-4.3070D-08
-1.4350D-07	2.5807D-07	-2.2253D-07	-4.5082D-08	1.3375D-07	-1.5565D-07
-3.1724D-07	1.9739D-08	-2.2277D-07	1.3159D-07	-4.3164D-08	-1.5624D-07
1.4233D-07	5.9817D-09	8.3775D-08	-1.1689D-07	2.3280D-08	9.1537D-08
-4.1695D-10	-1.8531D-08	2.2067D-08	1.5371D-08	-2.9678D-08	2.2542D-08
-5.0055D-08	-3.0524D-07	2.1209D-07	2.1447D-07	-4.2928D-07	2.1246D-07
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-5.0055D-08	-3.0524D-07	2.1209D-07	2.1447D-07	-4.2928D-07	2.1246D-07
3.2101D-09	-7.0106D-08	3.9904D-08	2.8615D-08	-7.1786D-08	4.0339D-08
-5.6447D-08	9.3344D-08	-9.5428D-08	2.7633D-08	7.3766D-08	-1.0093D-07
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7.2171D-08	8.4147D-08	-1.7196D-09	-1.0023D-07	9.4138D-08	3.6607D-09
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1.3516D-07	-2.2529D-08	7.8675D-08	-1.0843D-07	-5.8328D-09	8.9510D-08
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1.8519D-07	2.2456D-07	-2.3390D-08	-2.5505D-07	2.1939D-07	-7.8780D-09
1.8052D-07	7.1739D-09	1.0922D-07	-1.3465D-07	1.6974D-08	1.1907D-07
2.2702D-08	1.0969D-07	-6.6787D-08	-7.4205D-08	1.0388D-07	-6.4618D-08
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1.7998D-07	-7.9119D-09	1.2868D-07	-1.6155D-07	2.1150D-08	1.4025D-07
4.5407D-08	-1.7300D-07	1.2419D-07	7.3153D-08	-1.5071D-07	1.2283D-07
-1.1093D-07	2.4598D-11	-7.7985D-08	6.6826D-08	-1.7787D-08	-8.2390D-08
1.8902D-07	6.8170D-08	9.3223D-08	-1.3591D-07	7.6007D-08	1.0138D-07
1.8336D-08	-2.4478D-07	1.5405D-07	1.1482D-07	-2.1539D-07	1.5100D-07
9.9279D-08	-4.2876D-08	9.8466D-08	-6.4397D-08	-1.1940D-08	1.0499D-07
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2.3285D-08	-1.4193D-07	9.3544D-08	2.8298D-08	-1.5721D-07	9.7588D-08
9.7425D-08	-5.2721D-08	1.1348D-07	-3.8679D-08	-3.1027D-08	1.1838D-07
-1.1993D-07	1.1491D-09	-7.1816D-08	7.8898D-08	-2.3834D-09	-7.8810D-08
-3.9621D-09	1.2288D-07	-2.5400D-08	-1.7160D-09	1.0012D-07	-3.1156D-08
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1.2641D-07	2.4631D-08	5.9941D-08	-1.3505D-07	3.5743D-08	6.9649D-08
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-5.6717D-08	-1.4422D-07	3.9863D-08	8.5414D-08	-1.5385D-07	3.8077D-08
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-3.2938D-07	9.4624D-09	-2.0603D-07	2.5698D-07	-3.2777D-08	-2.2658D-07
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-8.2083D-08	-4.0764D-07	2.7011D-07	3.0360D-07	-5.4811D-07	2.6674D-07
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3.4318D-09	2.4350D-08	-6.2180D-08	6.2549D-08	7.6902D-09	-6.7441D-08
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2.1750D-07	-2.1097D-07	3.3994D-07	-5.6014D-07	1.3880D-07	3.8452D-07
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2.3371D-07	1.8873D-07	1.5395D-07	-6.6902D-07	2.6711D-07	1.7182D-07
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1.5492D-07	6.5320D-08	8.0358D-08	-1.0812D-07	8.4850D-08	8.5364D-08
-1.0888D-07	-2.4791D-07	6.9771D-08	2.1523D-07	-2.3158D-07	5.7665D-08
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1.8075D-07	2.1503D-08	1.3589D-07	-1.0686D-07	2.7395D-08	1.4113D-07
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-2.7944D-04	6.8705D-05	7.5706D-06	8.3018D-04	9.1326D-05	2.0841D-04
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1.2074D-04	1.0269D-05	1.4261D-04	-4.2999D-03	1.1613D-04	1.3644D-04
-2.7944D-04	6.8705D-05	7.5706D-06	8.3018D-04	9.1326D-05	2.0841D-04
4.8476D-05	-3.3918D-04	1.0228D-04	4.9727D-04	1.8749D-04	-1.9382D-05
1.2074D-04	1.0269D-05	1.4261D-04	-4.2999D-03	1.1613D-04	1.3644D-04
-2.4669D-04	-3.7799D-05	2.6570D-05	-2.0725D-04	-8.7772D-05	-8.5036D-04
-1.1720D-04	-3.2200D-04	-4.0620D-05	-1.5353D-05	1.8371D-04	4.6874D-04
-4.1432D-05	8.8192D-05	-4.1728D-03	1.3673D-04	1.2486D-04	-4.3179D-03
-2.4669D-04	-3.7799D-05	2.6570D-05	-2.0725D-04	-8.7772D-05	-8.5036D-04
-1.1720D-04	-3.2200D-04	-4.0620D-05	-1.5353D-05	1.8371D-04	4.6874D-04
-4.1432D-05	8.8192D-05	-4.1728D-03	1.3673D-04	1.2486D-04	-4.3179D-03
7.8680D-04	3.9041D-04	1.1505D-04	-3.8704D-04	4.1769D-04	2.6506D-04
-1.3226D-04	-1.0495D-04	1.5021D-04	-2.2750D-04	6.1400D-05	3.2808D-04
-1.9281D-04	-1.9319D-04	-4.3481D-04	1.0686D-04	2.6498D-04	-5.1286D-04
6.5341D-04	2.6580D-04	-8.8246D-05	-1.6488D-04	4.4430D-04	4.7126D-07
4.6174D-04	-4.6801D-05	1.6508D-04	-2.5896D-04	-1.1475D-05	2.5663D-04
1.3146D-05	2.4911D-04	7.5480D-05	-6.1995D-05	5.4428D-05	-7.6827D-05
-2.3275D-05	-4.9848D-04	-1.8298D-04	-3.7439D-05	2.2079D-04	-2.5899D-05
-2.9744D-04	-5.5745D-04	-8.5824D-05	1.3996D-04	-5.0794D-06	-1.4360D-04
7.4456D-04	-6.1084D-05	2.7102D-04	-2.7647D-04	-4.1577D-04	3.9546D-04
1.2474D-04	5.9926D-04	-1.3747D-04	3.4102D-04	6.1003D-05	-2.2311D-04
2.2962D-04	-3.7287D-04	5.2657D-05	-5.3008D-04	2.6203D-04	9.3032D-05
5.9886D-04	-2.2729D-04	1.3469D-04	-1.1937D-05	-4.4249D-04	1.8154D-04
2.9904D-04	-9.0303D-05	5.2494D-06	-4.1520D-05	-6.6654D-05	1.8614D-04
-8.5197D-05	4.0083D-04	-2.0244D-04	-3.6488D-05	2.5931D-04	-1.9266D-04
5.2018D-04	8.3173D-05	5.6519D-05	-1.0412D-04	1.3975D-04	-1.0246D-04
8.0382D-04	3.4011D-04	-2.0815D-04	1.8986D-04	4.6231D-05	-1.0032D-04
-3.4867D-04	-3.6866D-04	-7.9552D-05	1.5507D-04	-6.2094D-06	-1.5371D-04
4.4702D-05	6.6005D-04	-2.0184D-04	-4.0747D-04	4.6346D-04	-3.9964D-04
-3.2633D-05	-7.2740D-04	1.6185D-04	2.7366D-04	-2.1203D-04	2.6401D-04
2.5705D-05	-3.4141D-05	-4.2007D-04	4.4976D-04	-1.3005D-05	-4.5103D-04
3.3017D-04	8.5566D-05	2.8642D-04	-1.9560D-04	7.3740D-05	5.3640D-05
1.4354D-04	3.9992D-04	-1.6357D-04	-1.8541D-04	2.5493D-04	-2.0213D-05
-5.2793D-04	-9.0499D-04	-1.9072D-04	-1.0790D-04	1.3824D-04	-1.0917D-04
7.9620D-04	2.3456D-04	-3.1361D-04	9.8255D-05	-4.3998D-05	-1.8639D-04
1.2127D-04	1.5644D-05	-1.3981D-04	9.7535D-05	-3.2919D-06	-8.9186D-05
-1.4378D-04	3.0948D-05	1.0110D-04	4.8468D-05	-1.0701D-04	6.2202D-05
2.6989D-05	-1.4226D-04	-3.8628D-04	-2.3859D-04	4.3524D-04	-1.8071D-04

9.0528D-05	2.5774D-05	-5.1343D-04	4.0074D-04	-4.7302D-05	-3.4229D-04
-2.0460D-04	-1.7516D-04	-1.5126D-06	-1.3204D-06	-7.0766D-08	4.9200D-08
-1.6441D-03	-5.4958D-04	-1.0313D-04	2.8936D-05	3.7019D-05	-6.1252D-05
1.0900D-03	4.3402D-05	5.6420D-05	3.0667D-05	-5.3782D-05	2.2185D-06
-8.1132D-05	-1.4842D-04	2.0452D-03	1.8907D-03	-3.7581D-03	1.8520D-03
1.2500D-04	-8.4525D-05	3.5916D-03	-3.2710D-03	-1.2348D-05	3.2804D-03
1.6728D-03	2.2918D-03	-1.4384D-04	5.3784D-05	2.9088D-05	-1.1328D-04
-4.4703D-03	-4.7524D-03	9.2348D-05	9.5840D-06	-3.3161D-05	8.7873D-05
1.6232D-03	2.1958D-03	-9.1658D-05	1.5789D-05	-1.5511D-05	-4.9355D-05
4.5039D-03	2.9446D-03	1.0534D-04	3.6844D-05	-1.3149D-04	3.3686D-05
-6.1748D-03	-4.4704D-03	-1.5383D-04	1.1958D-04	-1.1331D-05	-4.0753D-05
-8.5459D-05	-9.4265D-04	4.1025D-05	4.4741D-05	-5.4336D-05	-5.6480D-06
3.9513D-04	1.6760D-03	4.3744D-03	2.5662D-04	-1.0056D-03	3.3721D-03
2.7009D-03	1.5955D-03	-2.4584D-03	1.0327D-03	-4.1379D-04	-2.0644D-03
1.5527D-03	1.4879D-03	-5.2442D-03	2.9883D-03	2.9168D-04	-3.2721D-03
3.2571D-03	2.5331D-03	2.9682D-03	1.2635D-03	-3.0578D-03	1.9712D-03
-3.1481D-03	-2.2850D-03	-6.1102D-04	8.6774D-04	9.6478D-05	-1.0007D-03
1.4185D-04	-1.2258D-03	-1.3633D-04	-5.5443D-04	3.9013D-03	-2.9695D-04
-2.6746D-03	-3.0798D-03	-2.7899D-03	2.4922D-03	-8.2601D-05	-2.5702D-03
-9.7479D-05	-2.9712D-04	1.5342D-03	1.8700D-03	-3.8791D-03	1.9210D-03
3.7582D-04	6.6606D-04	3.0066D-04	-3.4422D-03	7.4522D-04	1.7442D-04
-2.9655D-03	-2.7102D-03	5.1218D-04	-1.8461D-03	-7.3995D-04	1.0810D-03
1.5848D-03	1.2258D-03	-2.7005D-03	3.3745D-03	-3.9092D-04	-2.7904D-03
-2.8590D-03	-2.0384D-03	1.7792D-03	1.8456D-03	-3.2017D-03	1.2628D-03
-3.3065D-05	7.9984D-04	3.8136D-05	8.4904D-04	3.1286D-05	4.2669D-04
3.7675D-05	1.5156D-03	5.9283D-04	3.9002D-04	4.7637D-05	8.7607D-04
-1.6874D-03	-5.8583D-04	5.7414D-04	1.7537D-05	4.3379D-04	8.5888D-04
-4.0973D-04	-5.5506D-04	3.1322D-05	2.9665D-05	8.8868D-04	4.0620D-04
3.7123D-04	-1.3482D-03	4.2580D-04	4.1203D-04	8.6752D-04	2.2788D-05
1.6245D-03	1.1371D-04	4.5809D-04	8.7218D-04	4.0822D-04	4.2005D-05

12-State Internally Balanced Reduced Order Model

$\mathbf{F}_s$ =

Columns 1 thru 6

-3.3570D-01	1.6784D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.6784D+02	-3.3570D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.6046D-01	1.8021D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.8021D+02	-3.6046D-01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.6051D-01	1.8023D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.8023D+02	-3.6051D-01
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

Columns 7 thru 12

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00

0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-3.7983D-01	1.8962D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.8962D+02	-3.7983D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-4.9284D-01	2.0819D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-2.0819D+02	-4.9284D-01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-9.0750D-01	4.5316D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-4.5316D+02	-9.0750D-01

B, =

Columns 1 thru 6

-2.5124D-01	-3.7995D-01	-1.8055D-01	-2.4565D-01	4.5442D-01	-2.6779D-02
8.0502D-01	1.2179D+00	5.7516D-01	7.8035D-01	-1.4559D+00	8.7074D-02
-3.0169D-04	1.0454D-01	-7.2979D-03	7.9701D-02	1.7198D-01	-1.5124D-02
1.4851D-02	-6.1641D-01	6.2167D-02	-4.7442D-01	-1.0205D+00	8.6928D-02
-8.8786D-02	-7.9361D-02	-6.9706D-02	-5.4010D-02	4.3072D-03	5.3550D-02
6.8877D-01	6.1674D-01	5.4456D-01	4.1429D-01	-1.9250D-02	-4.2458D-01
-6.0988D-01	4.1611D-01	-4.7667D-01	2.9253D-01	-5.3902D-02	-7.3584D-01
5.4790D-03	-3.8870D-03	5.5958D-03	-3.2600D-03	4.6425D-04	6.7364D-03
7.1452D-02	-5.2138D-02	5.1438D-02	-3.2785D-02	2.1389D-02	-4.7989D-02
-7.8411D-01	5.7024D-01	-6.8420D-01	4.3474D-01	-2.0183D-01	5.0282D-01
-4.8046D-03	-6.9119D-03	8.1805D-03	1.2588D-02	8.3642D-03	-5.8491D-04
5.3819D-01	8.5129D-01	-5.0965D-01	-7.9929D-01	-9.8221D-01	4.2534D-02

Columns 7 thru 12

3.0199D-01	-3.2291D-02	-2.0356D-01	4.0696D-01	-1.2335D-01	2.7842D-01
-9.5961D-01	1.0527D-01	6.5402D-01	-1.3033D+00	3.9208D-01	-8.8479D-01
1.2395D-01	-1.4282D-02	-1.8177D-02	-1.0453D-01	-2.3228D-02	-8.1110D-02
-7.3304D-01	8.2037D-02	1.0897D-01	6.3227D-01	1.4776D-01	4.9368D-01
3.1982D-03	4.7052D-02	7.2910D-02	-9.3715D-02	5.4296D-02	-6.6806D-02
-1.5157D-02	-3.8619D-01	-5.6756D-01	7.1052D-01	-4.2857D-01	4.9961D-01
-1.2271D-02	-5.5924D-01	6.6266D-01	3.1792D-01	4.9037D-01	2.6571D-01
-1.5744D-05	6.4355D-03	-6.4889D-03	-3.0262D-03	-5.8225D-03	-3.3792D-03
7.5235D-03	-3.5079D-02	5.1177D-02	-6.1806D-03	2.8748D-02	4.4446D-03
-1.6656D-01	4.4558D-01	-5.4733D-01	3.2000D-02	-4.1326D-01	-5.8376D-03
-1.4753D-02	1.0275D-03	-3.4998D-03	7.5753D-03	6.7973D-03	-1.3053D-02
9.2252D-01	-4.3046D-02	4.6328D-01	-8.7962D-01	-4.3179D-01	8.2940D-01

Columns 13 thru 18

3.6931D-02	-3.7498D-02	3.7123D-02	-3.7605D-02	3.7015D-02	-3.7522D-02
-1.1773D-01	1.1861D-01	-1.1796D-01	1.1938D-01	-1.1806D-01	1.1925D-01
7.1226D-03	-8.0618D-03	8.8821D-03	1.6325D-02	-1.0335D-02	-8.1274D-03
-4.5673D-02	4.9712D-02	-5.5969D-02	-1.0400D-01	1.0074D-01	5.3627D-02
1.0801D-02	1.0690D-02	-1.0038D-02	3.1844D-05	-7.7165D-04	-1.0722D-02
-9.0988D-02	-9.1339D-02	8.4909D-02	2.1426D-03	6.1541D-03	8.9135D-02
-7.6602D-02	-6.2990D-02	-7.6228D-02	-6.1543D-02	-7.7131D-02	-6.2980D-02
-9.9176D-04	-1.1050D-03	-1.0204D-03	-1.0966D-03	-1.0003D-03	-1.1432D-03
2.4065D-03	2.6557D-04	-1.0924D-03	2.2277D-03	-6.9812D-04	-1.9539D-03

-1.1155D-01	3.6875D-02	6.4601D-02	-1.0758D-01	4.7630D-02	7.2410D-02
-3.6550D-04	6.6423D-04	-5.8228D-04	8.9717D-04	-4.6836D-04	7.8637D-04
1.6905D-01	-1.6550D-01	1.6649D-01	-1.5606D-01	1.6656D-01	-1.6106D-01

G, =

Columns 1 thru 6

-1.3906D-01	-1.1856D-01	-1.4421D-03	4.0823D-04	4.4313D-04	5.5124D-04
4.5835D-01	3.9087D-01	5.1691D-03	-5.1846D-04	-1.1369D-03	-1.2980D-03
-8.6747D-03	2.3588D-03	-6.7780D-03	5.4880D-03	1.8063D-03	-7.3385D-03
5.0398D-02	-1.4958D-02	4.5113D-02	-3.6798D-02	-1.1634D-02	4.8683D-02
1.1438D-03	6.0300D-03	-1.3163D-03	-3.9599D-03	5.5451D-03	-1.5527D-03
-9.7793D-03	-4.5020D-02	1.2616D-02	3.4799D-02	-4.9733D-02	1.4617D-02
1.1784D-02	8.1108D-03	3.6654D-02	2.3056D-02	2.3671D-02	2.3551D-02
-2.2823D-04	-1.8187D-04	1.0290D-03	9.8974D-04	1.0534D-03	1.0833D-03
-5.5829D-03	4.6213D-03	-1.3908D-02	6.3717D-03	8.1173D-03	-1.4549D-02
9.1074D-02	-7.0968D-02	1.1936D-01	-5.7227D-02	-6.9705D-02	1.2617D-01
9.1156D-04	6.9483D-04	2.0407D-04	-4.6826D-05	-4.3898D-05	-1.0346D-04
-2.4067D-01	-1.9934D-01	-5.1193D-04	3.9681D-03	8.3233D-03	7.5720D-03

C, =

Columns 1 thru 6

6.9990D-07	7.6933D-08	-1.0826D-05	-1.8131D-06	-2.8937D-07	-2.8695D-08
7.5863D-08	2.4398D-08	-1.0368D-07	-2.7497D-08	-2.3077D-06	-3.1382D-07
-4.0935D-08	-8.5291D-09	-1.4014D-06	-2.8080D-07	-5.9780D-06	-1.1575D-06
6.9990D-07	7.6933D-08	-1.0826D-05	-1.8131D-06	-2.8937D-07	-2.8695D-08
7.5863D-08	2.4398D-08	-1.0368D-07	-2.7497D-08	-2.3077D-06	-3.1382D-07
-4.0935D-08	-8.5291D-09	-1.4014D-06	-2.8080D-07	-5.9780D-06	-1.1575D-06
-4.1404D-07	-6.4871D-08	-9.1095D-07	-1.5111D-07	-5.8534D-06	-7.6193D-07
5.6734D-07	5.5616D-08	5.4415D-06	9.2998D-07	7.6667D-06	9.7390D-07
-2.8399D-08	1.6371D-08	-4.4063D-06	-1.0573D-06	4.1934D-06	7.5912D-07
-4.1404D-07	-6.4871D-08	-9.1095D-07	-1.5111D-07	-5.8534D-06	-7.6193D-07
5.6734D-07	5.5616D-08	5.4415D-06	9.2998D-07	7.6667D-06	9.7390D-07
-2.8399D-08	1.6371D-08	-4.4063D-06	-1.0573D-06	4.1934D-06	7.5912D-07
-2.8102D-07	-2.1535D-08	-1.0698D-06	-1.6149D-07	5.5620D-06	7.2668D-07
-6.3498D-07	-8.5617D-08	-5.9166D-06	-9.9709D-07	7.5116D-06	9.8072D-07
-4.7308D-08	-1.1634D-08	5.8428D-06	1.3332D-06	1.7471D-06	3.8972D-07
-2.8102D-07	-2.1535D-08	-1.0698D-06	-1.6149D-07	5.5620D-06	7.2668D-07
-6.3498D-07	-8.5617D-08	-5.9166D-06	-9.9709D-07	7.5116D-06	9.8072D-07
-4.7308D-08	-1.1634D-08	5.8428D-06	1.3332D-06	1.7471D-06	3.8972D-07
1.7427D-06	5.0624D-07	6.2630D-06	1.0377D-06	-5.8837D-06	-8.3086D-07
-3.2176D-06	-9.1000D-07	5.9615D-06	1.0935D-06	8.1058D-07	1.9847D-07
2.4771D-06	7.4170D-07	-6.9584D-06	-1.2849D-06	-5.0711D-07	-1.1965D-07
1.3114D-06	4.1140D-07	7.7582D-06	1.3410D-06	-6.7685D-06	-9.6229D-07
-2.4895D-06	-8.0758D-07	1.0156D-06	2.8126D-07	-3.1190D-08	1.0072D-08
-2.0135D-07	-6.4046D-08	1.7318D-08	2.1115D-08	5.5878D-06	8.7592D-07
2.9213D-07	9.0703D-08	3.0117D-08	-1.7604D-08	-6.5271D-06	-9.4903D-07
-6.3822D-06	-1.9152D-06	-1.0313D-06	3.3124D-08	-7.6569D-09	1.9366D-08
1.9062D-06	5.4994D-07	6.0366D-06	1.0307D-06	6.0708D-06	8.7065D-07
3.1224D-06	8.9018D-07	-5.9262D-06	-1.0605D-06	6.3965D-07	1.7823D-07

-2.3773D-06	-7.2325D-07	6.8533D-06	1.2327D-06	-2.5712D-07	-9.4260D-08
1.4761D-06	4.5395D-07	7.4441D-06	1.3266D-06	7.1183D-06	1.0236D-06
1.4150D-06	4.6734D-07	-3.8957D-06	-7.3794D-07	2.8401D-06	4.9994D-07
-2.0390D-06	-6.6548D-07	-2.8694D-06	-5.8394D-07	6.4168D-07	4.2904D-08
5.3648D-06	1.6102D-06	2.3981D-06	5.2278D-07	-2.3850D-06	-1.8568D-07
3.4398D-06	1.0483D-06	-5.1441D-06	-8.8583D-07	2.3076D-06	4.5498D-07
-3.6526D-06	-1.0349D-06	-4.1655D-06	-8.4187D-07	-4.5556D-08	1.3026D-08
8.6757D-08	3.4570D-08	1.2353D-07	8.1857D-09	-9.6465D-06	-1.2882D-06
-8.7144D-08	-3.5938D-08	-2.2318D-07	-2.2791D-08	1.1665D-05	1.6162D-06
-2.7936D-06	-8.4010D-07	-4.3801D-06	-8.5006D-07	-4.0535D-08	9.3238D-09
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2.2376D-06	7.4420D-07	2.8128D-06	5.9166D-07	6.0826D-07	3.8065D-08
-5.6535D-06	-1.7202D-06	-2.3231D-06	-5.3903D-07	-2.4143D-06	-1.8129D-07
2.9397D-06	8.9134D-07	-5.0736D-06	-8.7824D-07	-2.3993D-06	-4.1982D-07
2.3950D-09	8.2166D-09	5.3657D-06	8.2103D-07	6.7599D-08	2.7735D-09
-7.8432D-07	-2.1117D-07	3.8646D-08	1.7221D-08	-5.3819D-06	-6.1863D-07
-7.7240D-09	-8.8540D-09	1.8482D-06	2.9711D-07	6.7866D-06	8.5726D-07
5.4231D-08	2.5943D-08	7.2985D-06	1.1972D-06	1.5689D-06	1.9485D-07
-1.3263D-06	-3.6615D-07	-5.2250D-09	-2.0569D-09	-5.9202D-09	9.2206D-10
2.0189D-06	8.4267D-07	4.6948D-06	8.0902D-07	-7.9284D-07	-1.2495D-07
-3.3447D-06	-1.4455D-06	-8.4412D-07	-1.7747D-07	-4.7535D-06	-6.5529D-07
3.9497D-07	1.0965D-07	-1.3510D-06	-2.8633D-07	-6.2759D-06	-1.3402D-06
3.3350D-07	1.2453D-07	-6.2627D-06	-1.5822D-06	1.5392D-06	2.4926D-07
-7.9014D-06	-3.3780D-06	4.8999D-06	8.8016D-07	-3.1662D-08	-7.2475D-08
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-7.3170D-06	-3.1849D-06	4.5150D-06	8.1197D-07	-1.5968D-06	-2.7071D-07
-1.3432D-05	-5.7581D-06	-2.7532D-07	-5.1884D-08	-5.8433D-06	-8.4207D-07
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3.3882D-07	9.7731D-08	-7.0084D-07	-1.6294D-07	-4.2937D-06	-5.8417D-07
2.8050D-05	8.3512D-06	1.6410D-06	8.9181D-07	8.3791D-05	1.0350D-05
4.2452D-05	1.2581D-05	-7.5104D-05	-1.2067D-05	7.5093D-05	8.9211D-06
2.0312D-05	5.1481D-06	7.2850D-06	2.3803D-06	6.6238D-05	8.2053D-06
2.7696D-05	6.5762D-06	-5.7762D-05	-9.4400D-06	5.0548D-05	5.3559D-06
-5.0740D-05	-1.5066D-05	-1.2433D-04	-1.9775D-05	-2.3650D-06	-1.0064D-07
3.0258D-06	9.0742D-07	1.0600D-05	1.7100D-06	-5.1546D-05	-6.9741D-06
-3.3987D-05	-8.2995D-06	-8.9395D-05	-1.3791D-05	-1.8546D-06	-9.4985D-08
3.6538D-06	1.1138D-06	1.0011D-05	1.5616D-06	-4.6760D-05	-7.0317D-06
2.2807D-05	6.7013D-06	1.3200D-05	2.5685D-06	-6.9014D-05	-8.6987D-06
-4.5414D-05	-1.3518D-05	7.6897D-05	1.2668D-05	8.6536D-05	1.0113D-05
1.3973D-05	3.1186D-06	1.7776D-05	3.9504D-06	-5.2067D-05	-6.8147D-06
-3.1295D-05	-7.7868D-06	6.0024D-05	9.9133D-06	6.0943D-05	6.5922D-06
-4.1060D-06	-1.2166D-06	-5.5074D-06	-1.1118D-06	-1.1028D-05	-1.5429D-06
4.1293D-06	1.2578D-06	6.0048D-06	1.2239D-06	-1.1073D-05	-1.5972D-06
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-4.1095D-06	-1.2447D-06	1.2204D-05	2.2424D-06	7.5661D-07	6.7713D-09
4.1479D-06	1.2714D-06	6.4932D-06	1.1439D-06	1.0789D-05	1.6727D-06
-3.5162D-05	1.1042D-04	3.2347D-04	-1.9515D-03	2.9084D-06	-5.2279D-05
-4.1973D-06	1.2693D-05	4.4827D-06	-1.8841D-05	5.3057D-05	-4.1641D-04
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1.5096D-06	-8.1081D-06	-1.8624D-04	1.0628D-03	-4.3346D-05	3.1885D-04
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3.9258D-04	-1.2731D-03	-1.2864D-04	8.1710D-04	3.7435D-05	-2.8877D-04
7.1992D-04	-2.3325D-03	1.2953D-05	-4.9504D-05	1.2720D-04	-1.0564D-03

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-1.7752D-05	5.6397D-05	2.6277D-05	-1.2718D-04	8.9759D-05	-7.7620D-04
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-1.0650D-03	3.3454D-03	-2.8930D-04	1.3391D-03	-1.5524D-03	1.1929D-02
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1.7838D-03	-5.5806D-03	2.6914D-03	-1.6072D-02	1.8378D-05	-3.3440D-04
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1.1944D-03	1.1464D-04	4.5733D-02	8.6447D-03	1.9548D-01	2.8788D-02
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1.7049D-02	5.0677D-03	1.9218D-01	3.2204D-02	-2.4393D-01	-3.2253D-02
1.3589D-03	2.5504D-04	-1.9125D-01	-3.5807D-02	-5.7404D-02	-8.9642D-03
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1.7928D-01	5.5484D-02	3.3187D-02	9.1200D-04	2.2417D-04	-1.8238D-04
-5.3391D-02	-1.6456D-02	-1.9577D-01	-3.4699D-02	-1.9734D-01	-2.6902D-02
-8.7353D-02	-2.6966D-02	1.9252D-01	3.3758D-02	-2.1124D-02	-3.4065D-03
6.6919D-02	2.0524D-02	-2.2264D-01	-3.9187D-02	8.6030D-03	1.2195D-03
-4.1601D-02	-1.2728D-02	-2.4162D-01	-4.3551D-02	-2.3138D-01	-3.1641D-02
-4.0110D-02	-1.2374D-02	1.2700D-01	2.1488D-02	-9.2481D-02	-1.4408D-02

5.7757D-02	1.7724D-02	9.3373D-02	1.7850D-02	-2.0974D-02	-8.1107D-04
-1.5070D-01	-4.6651D-02	-7.3161D-02	-1.5329D-02	7.7397D-02	6.8670D-03
-9.6742D-02	-3.0007D-02	1.6736D-01	2.7323D-02	-7.5254D-02	-1.2440D-02
1.0212D-01	3.1573D-02	1.3582D-01	2.4288D-02	1.4337D-03	7.3514D-05
-2.4955D-03	-8.0473D-04	-4.0834D-03	2.0955D-04	3.1318D-01	4.2407D-02
2.5153D-03	8.1372D-04	7.3265D-03	2.1813D-04	-3.7886D-01	-5.2178D-02
7.8533D-02	2.4145D-02	1.4265D-01	2.5203D-02	1.2713D-03	1.9917D-04
-3.0424D-02	-9.3441D-03	1.2736D-01	2.1924D-02	9.2576D-02	1.3660D-02
-6.3445D-02	-1.9644D-02	-9.1672D-02	-1.7410D-02	-1.9905D-02	-4.8319D-04
1.5895D-01	4.9392D-02	7.5877D-02	1.5105D-02	7.8332D-02	6.7884D-03
-8.2646D-02	-2.5617D-02	1.6505D-01	2.7190D-02	7.8195D-02	1.1957D-02
-1.2815D-04	-5.1051D-05	-1.7405D-01	-2.7933D-02	-2.2549D-03	4.2885D-04
2.1828D-02	6.7719D-03	-1.3230D-03	-3.1744D-04	1.7466D-01	2.1520D-02
2.7587D-04	8.3365D-05	-6.0008D-02	-9.6422D-03	-2.2047D-01	-2.8210D-02
-1.6012D-03	-5.1182D-04	-2.3704D-01	-3.9120D-02	-5.1074D-02	-5.4634D-03
3.6997D-02	1.1469D-02	1.7588D-04	2.6687D-05	1.8744D-04	1.7458D-05
-5.8364D-02	-1.9020D-02	-1.5289D-01	-2.4273D-02	2.5763D-02	3.4021D-03
9.7099D-02	3.1664D-02	2.7542D-02	5.5188D-03	1.5480D-01	1.8436D-02
-1.0977D-02	-3.5496D-03	4.4184D-02	8.4456D-03	2.0571D-01	3.1055D-02
-9.5554D-03	-3.0273D-03	2.0575D-01	3.9347D-02	-5.0022D-02	-6.7750D-03
2.2908D-01	7.4702D-02	-1.5971D-01	-2.5595D-02	1.1936D-03	2.6014D-04
-3.7956D-01	-1.2388D-01	5.8757D-02	1.0890D-02	1.7805D-01	2.1455D-02
2.1256D-01	6.9439D-02	-1.4719D-01	-2.3451D-02	5.2002D-02	6.9936D-03
3.8953D-01	1.2706D-01	8.9487D-03	2.2650D-03	1.9033D-01	2.3294D-02
-4.4510D-01	-1.4523D-01	-1.9941D-01	-3.2128D-02	3.8627D-02	4.9720D-03
-9.4542D-03	-3.0254D-03	2.2939D-02	4.7061D-03	1.3983D-01	1.6499D-02
-7.8627D-01	-2.4745D-01	-5.4669D-02	-2.0853D-02	-2.7191D+00	-3.5415D-01
-1.1894D+00	-3.7454D-01	2.4362D+00	4.0703D-01	-2.4357D+00	-3.1457D-01
-5.6249D-01	-1.7555D-01	-2.4061D-01	-5.6135D-02	-2.1494D+00	-2.8290D-01
-7.6360D-01	-2.3750D-01	1.8741D+00	3.1709D-01	-1.6369D+00	-2.0891D-01
1.4219D+00	4.4776D-01	4.0316D+00	6.7535D-01	7.6918D-02	4.0711D-03
-8.5062D-02	-2.6096D-02	-3.4408D-01	-5.8692D-02	1.6742D+00	2.2963D-01
9.3877D-01	2.9257D-01	2.8961D+00	4.8518D-01	6.0240D-02	3.3650D-03
-1.0273D-01	-3.1993D-02	-3.2450D-01	-5.5100D-02	1.5212D+00	2.1574D-01
-6.3870D-01	-2.0062D-01	-4.2984D-01	-7.7969D-02	2.2401D+00	2.9678D-01
1.2729D+00	4.0103D-01	-2.4943D+00	-4.2888D-01	-2.8072D+00	-3.5342D-01
-3.8384D-01	-1.1858D-01	-5.8121D-01	-1.0903D-01	1.6904D+00	2.2856D-01
8.6544D-01	2.7022D-01	-1.9465D+00	-3.3807D-01	-1.9747D+00	-2.4556D-01
1.1521D-01	3.5652D-02	1.7939D-01	3.2987D-02	3.5795D-01	5.1746D-02
-1.1613D-01	-3.5983D-02	-1.9599D-01	-3.4470D-02	3.5952D-01	5.2143D-02
1.1537D-01	3.6008D-02	2.2048D-01	3.9832D-02	-3.3427D-01	-4.7947D-02
-1.1695D-01	-3.5922D-02	4.0892D-01	7.4979D-02	-8.3574D-03	-2.3346D-03
1.1554D-01	3.5746D-02	-3.9626D-01	-7.2327D-02	-2.4010D-02	-3.7861D-03
-1.1678D-01	-3.6011D-02	-2.1027D-01	-4.0096D-02	-3.5096D-01	-4.9809D-02

Columns 7 thru 12

-2.1187D-08	-1.5431D-08	1.6116D-06	1.1667D-06	2.9237D-06	4.4338D-07
-5.5670D-08	2.2438D-06	-1.2260D-06	-4.9976D-08	-5.5356D-08	2.2485D-10
-3.6595D-07	-2.5750D-06	-6.2728D-06	5.0085D-07	1.5696D-07	3.4178D-08
-2.1187D-08	-1.5431D-08	1.6116D-06	1.1667D-06	2.9237D-06	4.4338D-07
-5.5670D-08	2.2438D-06	-1.2260D-06	-4.9976D-08	-5.5356D-08	2.2485D-10

-3.6595D-07	-2.5750D-06	-6.2728D-06	5.0085D-07	1.5696D-07	3.4178D-08
5.7003D-08	-1.9227D-06	1.1345D-06	6.7265D-07	-1.3061D-06	-2.0367D-07
1.2080D-08	-1.1337D-06	-4.4948D-07	-1.0780D-06	2.6940D-06	3.8482D-07
-3.5895D-07	-2.5113D-06	-5.1455D-06	4.2138D-07	7.6749D-08	-4.1945D-08
5.7003D-08	-1.9227D-06	1.1345D-06	6.7265D-07	-1.3061D-06	-2.0367D-07
1.2080D-08	-1.1337D-06	-4.4948D-07	-1.0780D-06	2.6940D-06	3.8482D-07
-3.5895D-07	-2.5113D-06	-5.1455D-06	4.2138D-07	7.6749D-08	-4.1945D-08
-3.8024D-08	1.9783D-06	2.0254D-06	-9.4336D-10	-1.6083D-06	-2.1435D-07
4.7221D-08	-1.0768D-06	-4.0898D-07	-1.5136D-07	-2.5871D-06	-3.6057D-07
-3.7343D-07	-2.5647D-06	1.1360D-05	-9.8002D-07	1.4306D-07	3.0072D-08
-3.8024D-08	1.9783D-06	2.0254D-06	-9.4336D-10	-1.6083D-06	-2.1435D-07
4.7221D-08	-1.0768D-06	-4.0898D-07	-1.5136D-07	-2.5871D-06	-3.6057D-07
-3.7343D-07	-2.5647D-06	1.1360D-05	-9.8002D-07	1.4306D-07	3.0072D-08
-2.6420D-07	-7.8555D-06	9.8059D-07	-1.4233D-07	1.5575D-09	9.5458D-08
-1.3899D-07	-3.7962D-06	5.9260D-06	1.7245D-06	2.5420D-07	-2.0108D-07
1.7902D-07	4.3664D-06	-3.9924D-06	-2.6778D-06	1.5133D-06	3.5035D-08
-3.0960D-07	-8.7638D-06	-5.6602D-07	-5.5454D-07	9.5423D-07	2.8104D-08
-1.3586D-09	5.9983D-07	3.8181D-06	1.0507D-06	1.1607D-06	7.7815D-08
-1.4236D-08	-8.5792D-06	-3.7729D-07	-2.9688D-07	-9.5044D-08	-9.8865D-09
9.1273D-08	1.3315D-05	2.5261D-07	2.4594D-07	6.5181D-08	1.2620D-08
1.4203D-08	1.1625D-06	2.3903D-06	1.0679D-06	1.7554D-06	-9.0754D-08
2.5571D-07	7.3541D-06	9.1406D-06	1.6413D-06	-2.1598D-07	8.2813D-08
-1.6752D-07	-4.9508D-06	-4.3899D-06	-7.9642D-07	-2.0332D-07	1.8307D-07
1.8946D-07	5.4707D-06	4.3675D-06	8.8770D-07	-1.4970D-06	-6.9214D-08
3.1160D-07	8.3025D-06	9.8535D-06	1.9446D-06	8.6030D-07	1.8171D-08
1.7278D-08	7.2073D-06	2.6647D-06	7.7472D-07	-5.9318D-07	-6.0652D-08
6.5294D-09	4.7760D-06	-3.1602D-06	-8.7158D-07	1.0784D-06	7.8939D-08
-6.0229D-08	-7.6382D-06	1.5783D-06	9.3693D-07	-1.5023D-06	7.0449D-08
7.5989D-08	1.1023D-05	1.9196D-06	7.5242D-07	-9.7903D-07	1.5220D-08
2.0296D-08	6.1285D-07	-3.9168D-06	-1.4550D-06	2.5559D-07	-2.3353D-07
3.0822D-07	8.8272D-06	-6.2280D-06	-9.5362D-07	-6.1076D-08	-2.1882D-08
-3.6917D-07	-9.9088D-06	6.6289D-06	1.1178D-06	6.1707D-08	2.6562D-08
9.5682D-09	5.4070D-07	-6.9732D-06	-2.3971D-06	-1.8576D-06	-1.1358D-07
-6.2161D-09	-7.7007D-06	8.7132D-07	4.0484D-07	-6.2854D-07	-6.4567D-08
1.2556D-08	3.8470D-06	-7.5790D-07	-3.5696D-07	-1.0645D-06	-1.0430D-07
-3.6818D-08	-5.7038D-06	4.7491D-07	3.0179D-07	1.5794D-06	-3.4037D-08
-8.1522D-08	-1.2110D-05	1.0612D-06	2.9514D-07	-8.6435D-07	1.7376D-08
2.4707D-10	-1.1413D-07	-7.8880D-06	-3.1531D-06	1.1474D-08	-2.0513D-08
-3.0580D-09	6.2817D-08	4.9358D-06	2.1750D-06	7.7972D-07	-7.5071D-08
1.0350D-08	3.0835D-07	-9.0799D-06	-3.5455D-06	1.8836D-07	2.2901D-08
2.3008D-08	9.2871D-07	-1.3182D-05	-4.8758D-06	-2.9477D-07	-2.2988D-08
7.6771D-09	2.2122D-07	9.9109D-09	1.5233D-09	1.3349D-06	-1.0018D-07
2.6836D-08	-1.9724D-07	9.4544D-06	1.3013D-06	-6.5718D-07	-5.0999D-07
-5.4751D-08	2.4362D-07	-5.9462D-06	-8.4006D-07	1.0703D-06	9.8466D-07
1.1610D-09	-1.6843D-08	-6.2352D-06	5.4051D-07	-4.9765D-07	5.1918D-08
1.1618D-08	1.0114D-07	-1.0808D-05	8.7000D-07	-4.0467D-07	-5.4742D-08
-1.3477D-07	1.0837D-06	9.3011D-06	1.3511D-06	2.5490D-06	2.2292D-06
2.2904D-07	-8.8397D-07	-6.2607D-06	-9.7569D-07	-3.7086D-06	-3.7394D-06
-1.3791D-07	2.1777D-07	8.0088D-06	1.3376D-06	1.9299D-06	2.2137D-06
-2.2316D-07	1.3567D-06	-7.2012D-06	-7.5821D-07	4.0795D-06	3.8260D-06
2.5527D-07	-1.2841D-06	8.0198D-06	1.1881D-06	-4.4811D-06	-4.3275D-06

-2.4746D-11	-5.2131D-07	-5.5959D-06	-8.5402D-07	-3.5109D-07	3.1052D-08
4.1850D-07	6.6421D-05	-7.0397D-05	4.6433D-06	1.0202D-05	7.3489D-07
-3.7597D-07	-4.5326D-05	5.1206D-05	-3.2316D-06	1.6134D-05	1.3353D-06
-5.2197D-08	5.1910D-05	-6.1139D-05	1.1632D-06	-9.7482D-06	3.2846D-06
-3.8230D-07	-3.1862D-05	3.8880D-05	-7.5214D-07	-1.5298D-05	5.6464D-06
1.0431D-07	5.8591D-06	-1.8255D-05	2.6852D-06	-1.8619D-05	-1.5115D-06
5.7327D-07	8.0126D-05	4.5221D-05	-3.3336D-06	8.0633D-07	-4.4314D-08
3.2061D-07	1.3215D-06	-1.4823D-05	-3.1740D-07	1.7649D-05	-6.3426D-06
1.7472D-07	6.0892D-05	3.9886D-05	-9.9706D-07	-8.2068D-07	2.9575D-08
-5.5679D-07	-7.2196D-05	-4.9182D-05	3.9192D-06	8.7773D-06	8.3542D-07
-1.6612D-07	-3.4638D-05	3.0286D-06	-1.6148D-06	-1.6676D-05	-1.2747D-06
-3.4323D-07	-5.3429D-05	-3.6906D-05	7.1513D-07	-8.2713D-06	3.3325D-06
2.2458D-07	-2.8958D-05	-5.2367D-07	1.2121D-07	1.5862D-05	-5.4942D-06
3.7391D-07	8.3431D-06	-9.7561D-06	-2.3435D-06	3.2143D-06	-1.1471D-07
3.4724D-07	6.8649D-06	3.0975D-06	2.1326D-06	-3.1431D-06	2.7639D-08
3.5057D-07	8.2992D-06	5.5618D-06	2.3703D-06	3.1606D-06	2.5569D-08
3.4870D-07	6.7033D-06	-9.3843D-06	-2.4941D-06	-2.9676D-06	1.2703D-07
3.7323D-07	8.4047D-06	4.2359D-06	1.0052D-07	3.1632D-06	-4.5614D-08
3.5424D-07	6.8551D-06	6.4201D-06	4.9818D-07	-3.0570D-06	-1.8566D-08
3.0640D-06	2.2289D-07	-1.9517D-04	3.3949D-04	-4.8517D-06	1.3284D-03
-4.2538D-04	-4.7978D-06	-6.2189D-06	-2.5659D-04	8.9769D-07	-2.5019D-05
4.8868D-04	-3.4327D-05	-2.3499D-04	-1.3158D-03	-2.5379D-08	7.1798D-05
3.0640D-06	2.2289D-07	-1.9517D-04	3.3949D-04	-4.8517D-06	1.3284D-03
-4.2538D-04	-4.7978D-06	-6.2189D-06	-2.5659D-04	8.9769D-07	-2.5019D-05
4.8868D-04	-3.4327D-05	-2.3499D-04	-1.3158D-03	-2.5379D-08	7.1798D-05
3.6455D-04	4.0192D-06	-1.0526D-04	2.3923D-04	8.1675D-07	-5.9343D-04
2.1508D-04	2.8793D-06	1.8974D-04	-9.6612D-05	-6.0870D-06	1.2238D-03
4.7632D-04	-3.3265D-05	-1.7784D-04	-1.0784D-03	8.6666D-07	3.3993D-05
3.6455D-04	4.0192D-06	-1.0526D-04	2.3923D-04	8.1675D-07	-5.9343D-04
2.1508D-04	2.8793D-06	1.8974D-04	-9.6612D-05	-6.0870D-06	1.2238D-03
4.7632D-04	-3.3265D-05	-1.7784D-04	-1.0784D-03	8.6666D-07	3.3993D-05
-3.7505D-04	-3.8703D-06	2.1651D-05	4.2338D-04	5.2219D-06	-7.3031D-04
2.0425D-04	2.8274D-06	1.1548D-05	-8.6648D-05	2.9078D-06	-1.1751D-03
4.8630D-04	-3.3309D-05	4.2027D-04	2.3810D-03	6.6690D-07	6.5186D-05
-3.7505D-04	-3.8703D-06	2.1651D-05	4.2338D-04	5.2219D-06	-7.3031D-04
2.0425D-04	2.8274D-06	1.1548D-05	-8.6648D-05	2.9078D-06	-1.1751D-03
4.8630D-04	-3.3309D-05	4.2027D-04	2.3810D-03	6.6690D-07	6.5186D-05
1.4899D-03	-5.8727D-05	-4.5239D-05	1.9879D-04	-9.1843D-07	1.5251D-06
7.1981D-04	-3.3830D-05	-2.9165D-04	1.2396D-03	-2.3445D-06	1.1289D-04
-8.2790D-04	3.9989D-05	4.7667D-04	-1.8792D-03	-1.0615D-05	6.8709D-04
1.6621D-03	-6.9835D-05	3.2582D-05	-1.2392D-04	-7.9873D-06	4.3257D-04
-1.1367D-04	1.4752D-06	-2.7210D-04	7.9108D-04	9.1238D-06	5.2715D-04
1.6268D-03	-1.8604D-05	1.0829D-04	-7.4941D-05	8.8492D-07	-4.3263D-05
-2.5247D-03	3.6805D-05	-1.0256D-04	4.8528D-05	-1.6728D-06	2.9757D-05
-2.2049D-04	1.2488D-06	-2.7137D-04	4.9407D-04	-5.0874D-06	7.9491D-04
-1.3945D-03	5.9006D-05	-3.9651D-04	1.8992D-03	3.1328D-06	-9.7049D-05
9.3858D-04	-3.5104D-05	2.1122D-04	-9.1081D-04	2.0027D-06	-9.0399D-05
-1.0370D-03	4.2438D-05	-2.2865D-04	9.0631D-04	1.0150D-05	-6.7901D-04
-1.5745D-03	6.9440D-05	-4.5857D-04	2.0478D-03	-5.5015D-06	3.9002D-04
-1.3665D-03	1.6098D-05	-2.1822D-04	5.5062D-04	-4.4681D-06	-2.6980D-04
-9.0535D-04	1.1293D-05	2.1645D-04	-6.5528D-04	7.6019D-06	4.8976D-04

1.4481D-03	-2.0313D-05	-2.1850D-04	3.2677D-04	4.0351D-06	-6.8032D-04
-2.0902D-03	3.1873D-05	-2.1292D-04	3.9545D-04	2.5683D-06	-4.4389D-04
-1.1630D-04	6.6746D-07	2.1444D-04	-8.2251D-04	-3.0319D-06	1.1322D-04
-1.6734D-03	6.9939D-05	2.3782D-04	-1.2936D-03	1.7419D-06	-2.7953D-05
1.8784D-03	-8.2843D-05	-2.7021D-04	1.3772D-03	-2.3596D-06	2.8309D-05
-1.0271D-04	1.0939D-06	3.9803D-04	-1.4602D-03	1.2632D-05	-8.4327D-04
1.4603D-03	-1.6824D-05	-1.4957D-04	1.7688D-04	-5.7121D-06	-2.8581D-04
-7.2933D-04	8.9930D-06	1.1511D-04	-1.5467D-04	-6.8626D-06	-4.8392D-04
1.0814D-03	-1.7954D-05	-1.0783D-04	9.5515D-05	-5.8871D-06	7.1588D-04
2.2963D-03	-3.2660D-05	-1.3598D-04	2.1553D-04	6.4098D-07	-3.9187D-04
2.1380D-05	-7.9644D-07	5.5091D-04	-1.6514D-03	2.1383D-09	4.8522D-06
-1.2357D-05	-1.6946D-06	-3.8087D-04	1.0336D-03	-8.9695D-06	3.5398D-04
-5.7947D-05	2.7299D-06	6.5019D-04	-1.8980D-03	-3.2138D-06	8.5895D-05
-1.7648D-04	4.8972D-06	8.8864D-04	-2.7559D-03	5.6362D-07	-1.3431D-04
-4.1958D-05	1.3443D-07	-1.0220D-06	2.0407D-06	-1.6344D-05	6.0659D-04
3.7555D-05	-3.2159D-07	-9.5958D-05	1.9826D-03	-1.4017D-05	-3.0209D-04
-4.5699D-05	1.2477D-06	5.9649D-05	-1.2472D-03	2.1946D-05	4.9432D-04
3.4620D-06	-8.6851D-07	-3.2131D-04	-1.3136D-03	-7.6917D-07	-2.2445D-04
-1.9014D-05	-1.9666D-07	-4.7189D-04	-2.2719D-03	-2.2917D-07	-1.8438D-04
-2.0490D-04	1.9032D-06	-8.6407D-05	1.9515D-03	5.2686D-05	1.1756D-03
1.6731D-04	-2.8434D-06	5.3759D-05	-1.3141D-03	-9.1306D-05	-1.7140D-03
-4.0728D-05	2.0381D-06	-8.6800D-05	1.6821D-03	5.1084D-05	8.9486D-04
-2.5633D-04	3.5870D-06	6.0172D-05	-1.5080D-03	9.0612D-05	1.8837D-03
2.4307D-04	-3.5370D-06	-9.7457D-05	1.6831D-03	-1.0581D-04	-2.0695D-03
9.9187D-05	5.1761D-07	5.6739D-05	-1.1745D-03	-1.8100D-06	-1.5843D-04
-1.2596D-02	4.2241D-07	-5.9341D-04	-1.4628D-02	4.2201D-05	4.6317D-03
8.5947D-03	4.7827D-06	4.0426D-04	1.0638D-02	6.4578D-05	7.3258D-03
-9.8443D-03	-3.7960D-05	4.5519D-04	-1.2679D-02	2.6722D-05	-4.3880D-03
6.0423D-03	2.6229D-05	-3.0667D-04	8.0574D-03	6.0505D-05	-6.8820D-03
-1.1124D-03	-6.5850D-06	-3.0258D-04	-3.7823D-03	-7.5949D-05	-8.4528D-03
-1.5196D-02	-1.0552D-06	4.4316D-04	9.3923D-03	5.7820D-06	3.6587D-04
-2.5256D-04	-7.7306D-06	6.2607D-04	-3.0446D-03	-6.3316D-05	7.9438D-03
-1.1549D-02	-4.8390D-05	-2.6754D-04	8.2654D-03	-4.0815D-06	-3.7032D-04
1.3689D-02	2.3095D-06	-4.7053D-04	-1.0217D-02	3.7076D-05	3.9867D-03
6.5674D-03	-3.2401D-06	1.4482D-04	6.1446D-04	-6.5973D-05	-7.5701D-03
1.0130D-02	4.1827D-05	5.2806D-04	-7.6370D-03	4.0190D-05	-3.7179D-03
5.4896D-03	1.6135D-05	-4.7353D-04	-1.4322D-04	-5.0184D-05	7.1418D-03
-1.5820D-03	7.0599D-05	4.7759D-04	-2.0321D-03	2.3862D-07	1.4548D-03
-1.3014D-03	6.8602D-05	-1.7535D-04	6.6649D-04	-2.1901D-06	-1.4245D-03
-1.5739D-03	6.8655D-05	-2.3625D-04	1.1780D-03	1.7616D-06	1.4330D-03
-1.2709D-03	6.8123D-05	4.6761D-04	-1.9585D-03	-5.4999D-06	-1.3430D-03
-1.5934D-03	7.0623D-05	-2.6770D-04	8.6302D-04	-9.7649D-07	1.4333D-03
-1.3003D-03	6.7278D-05	-3.1789D-04	1.3202D-03	-3.2031D-06	-1.3860D-03
6.0369D-05	5.8116D-04	-7.1350D-02	-4.2583D-02	-6.0210D-01	-1.4166D-02
1.2070D-03	-8.0671D-02	5.3267D-02	-9.1085D-04	1.1342D-02	6.6765D-04
7.0124D-03	9.2653D-02	2.7222D-01	-4.6072D-02	-3.2484D-02	-8.5754D-05
6.0369D-05	5.8116D-04	-7.1350D-02	-4.2583D-02	-6.0210D-01	-1.4166D-02
1.2070D-03	-8.0671D-02	5.3267D-02	-9.1085D-04	1.1342D-02	6.6765D-04
7.0124D-03	9.2653D-02	2.7222D-01	-4.6072D-02	-3.2484D-02	-8.5754D-05
-1.0546D-03	6.9142D-02	-5.0141D-02	-2.3092D-02	2.6898D-01	6.0039D-03
-5.9900D-04	4.0797D-02	2.0839D-02	4.0947D-02	-5.5468D-01	-1.3292D-02

6.7991D-03	9.0249D-02	2.2331D-01	-3.5373D-02	-1.5444D-02	5.5406D-04
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6.7991D-03	9.0249D-02	2.2331D-01	-3.5373D-02	-1.5444D-02	5.5406D-04
9.5627D-04	-7.1128D-02	-8.7902D-02	3.9990D-03	3.3101D-01	8.5779D-03
-7.3551D-04	3.8739D-02	1.8019D-02	2.8985D-03	5.3258D-01	1.1672D-02
6.8233D-03	9.2179D-02	-4.9282D-01	8.2922D-02	-2.9526D-02	2.3287D-04
9.5627D-04	-7.1128D-02	-8.7902D-02	3.9990D-03	3.3101D-01	8.5779D-03
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6.8233D-03	9.2179D-02	-4.9282D-01	8.2922D-02	-2.9526D-02	2.3287D-04
9.9413D-03	2.8246D-01	-4.1639D-02	-8.1478D-03	-7.1793D-04	-1.6656D-03
5.7317D-03	1.3646D-01	-2.5874D-01	-6.4623D-02	-5.1219D-02	8.8915D-04
-6.8553D-03	-1.5695D-01	3.9238D-01	1.0452D-01	-3.1120D-01	-8.9810D-03
1.1834D-02	3.1511D-01	2.5723D-02	8.4804D-03	-1.9601D-01	-6.1451D-03
-1.3451D-04	-2.1545D-02	-1.6551D-01	-5.7764D-02	-2.3879D-01	5.7162D-03
2.3169D-03	3.0847D-01	1.6063D-02	2.1684D-02	1.9584D-02	6.6424D-04
-5.1671D-03	-4.7872D-01	-1.0543D-02	-2.0557D-02	-1.3466D-02	-9.2512D-04
-1.3947D-04	-4.1805D-02	-1.0377D-01	-5.7973D-02	-3.6009D-01	-2.6383D-03
-9.9333D-03	-2.6436D-01	-3.9632D-01	-8.4675D-02	4.4012D-02	5.6867D-04
5.9124D-03	1.7792D-01	1.9021D-01	4.4634D-02	4.1009D-02	-1.2772D-03
-7.1030D-03	-1.9656D-01	-1.8938D-01	-4.8700D-02	3.0755D-01	9.0156D-03
-1.1782D-02	-2.9847D-01	-4.2740D-01	-9.8350D-02	-1.7665D-01	-4.6453D-03
-2.0193D-03	-2.5912D-01	-1.1536D-01	-4.5699D-02	1.2219D-01	-2.8777D-03
-1.4137D-03	-1.7168D-01	1.3697D-01	4.6338D-02	-2.2187D-01	4.5431D-03
2.8749D-03	2.7459D-01	-6.8717D-02	-4.7335D-02	3.0819D-01	2.2950D-03
-4.4743D-03	-3.9632D-01	-8.3088D-02	-4.4887D-02	2.0106D-01	1.4018D-03
-1.4898D-04	-2.2066D-02	1.7173D-01	4.8357D-02	-5.1361D-02	9.5438D-04
-1.1793D-02	-3.1722D-01	2.6971D-01	5.0750D-02	1.2641D-02	9.5965D-04
1.4039D-02	3.5608D-01	-2.8720D-01	-5.8035D-02	-1.2792D-02	-1.2620D-03
-1.7332D-04	-1.9494D-02	3.0502D-01	8.7858D-02	3.8198D-01	1.0719D-02
2.0609D-03	2.7690D-01	-3.7472D-02	-2.9919D-02	1.2944D-01	-3.1576D-03
-1.1805D-03	-1.3829D-01	3.2602D-02	2.3483D-02	2.1917D-01	-4.4580D-03
2.5697D-03	2.0505D-01	-2.0287D-02	-2.2064D-02	-3.2425D-01	-2.9931D-03
4.5562D-03	4.3542D-01	-4.5419D-02	-2.7054D-02	1.7748D-01	6.5328D-04
8.4796D-05	4.0371D-03	3.4538D-01	1.2060D-01	-2.1896D-03	2.4561D-05
2.6176D-04	-2.3574D-03	-2.1618D-01	-8.3144D-02	-1.5994D-01	-6.9818D-04
-4.1144D-04	-1.0971D-02	3.9688D-01	1.4099D-01	-3.8924D-02	-1.1702D-03
-8.5536D-04	-3.3483D-02	5.7630D-01	1.9322D-01	6.0779D-02	-2.3054D-04
-2.7784D-05	-7.9580D-03	-4.3414D-04	-1.7625D-04	-2.7414D-01	-1.6259D-03
-8.9743D-05	7.1403D-03	-4.1236D-01	-2.4226D-02	1.3700D-01	-3.5492D-04
1.3678D-04	-8.6388D-03	2.5928D-01	1.5021D-02	-2.2414D-01	-3.9108D-04
1.6407D-04	6.8963D-04	2.7135D-01	-6.2456D-02	1.0176D-01	-6.9045D-04
3.1376D-05	-3.6302D-03	4.6988D-01	-9.2478D-02	8.3485D-02	-2.4164D-04
4.2364D-04	-3.8839D-02	-4.0582D-01	-2.2920D-02	-5.3306D-01	-1.0436D-04
-6.6119D-04	3.1752D-02	2.7313D-01	1.5024D-02	7.7734D-01	2.1417D-04
3.5344D-04	-7.7072D-03	-3.4983D-01	-2.2917D-02	-4.0585D-01	-8.5132D-04
6.5269D-04	-4.8584D-02	3.1350D-01	1.4466D-02	-8.5420D-01	-4.3562D-04
-7.4923D-04	4.6117D-02	-3.5015D-01	-2.3525D-02	9.3852D-01	1.9792D-05
-6.6666D-05	1.8837D-02	2.4415D-01	1.4632D-02	7.1798D-02	-8.0319D-04
2.7161D-03	-2.3887D+00	3.0381D+00	-1.3287D-01	-2.0987D+00	1.4482D-02
-2.3730D-03	1.6298D+00	-2.2092D+00	9.1591D-02	-3.3196D+00	1.9626D-02

9.7599D-03	-1.8670D+00	2.6377D+00	8.1227D-02	1.9874D+00	-3.1887D-02
-4.6604D-03	1.1459D+00	-1.6760D+00	-5.4671D-02	3.1168D+00	-4.9175D-02
8.2199D-04	-2.1101D-01	7.8520D-01	-7.3127D-02	3.8302D+00	-2.3872D-02
2.9407D-03	-2.8821D+00	-1.9495D+00	9.8997D-02	-1.6573D-01	3.5971D-03
-3.7186D-04	-4.7927D-02	6.3611D-01	1.1847D-01	-3.5974D+00	5.9419D-02
1.0842D-02	-2.1903D+00	-1.7187D+00	-4.5990D-02	1.6793D-01	-1.8719D-03
-3.1066D-03	2.5958D+00	2.1221D+00	-1.0933D-01	-1.8065D+00	1.0680D-02
-1.4474D-03	1.2453D+00	-1.2682D-01	3.8859D-02	3.4302D+00	-2.1362D-02
-9.0001D-03	1.9210D+00	1.5906D+00	9.5176D-02	1.6838D+00	-2.5994D-02
-5.8346D-03	1.0410D+00	2.7690D-02	-8.6953D-02	-3.2343D+00	5.3233D-02
-1.2269D-02	-2.9991D-01	4.2414D-01	1.0449D-01	-6.5926D-01	-1.9353D-03
-1.1948D-02	-2.4667D-01	-1.3914D-01	-4.2788D-02	6.4537D-01	1.0062D-03
-1.1849D-02	-2.9838D-01	-2.4549D-01	-5.6287D-02	-6.4924D-01	-1.3960D-03
-1.1893D-02	-2.4091D-01	4.0883D-01	1.0275D-01	6.0858D-01	-5.0296D-04
-1.2159D-02	-3.0204D-01	-1.8062D-01	-5.3692D-02	-6.4947D-01	-2.2414D-03
-1.1731D-02	-2.4648D-01	-2.7565D-01	-6.5424D-02	6.2802D-01	8.5601D-04

$\mathbf{D}_{sy}$ =

Columns 1 thru 6

7.8334D-08	1.0820D-08	1.9385D-07	1.3056D-07	-4.2468D-08	-7.6874D-10
-2.1738D-08	2.6561D-08	-1.1494D-08	7.1472D-08	-2.1262D-09	1.7183D-08
-4.3060D-08	2.4726D-07	-2.5007D-08	6.1247D-07	-9.3338D-09	-1.9677D-08
7.8334D-08	1.0820D-08	1.9385D-07	1.3056D-07	-4.2468D-08	-7.6874D-10
-2.1738D-08	2.6561D-08	-1.1494D-08	7.1472D-08	-2.1262D-09	1.7183D-08
-4.3060D-08	2.4726D-07	-2.5007D-08	6.1247D-07	-9.3338D-09	-1.9677D-08
4.4863D-08	-4.3481D-08	5.1724D-08	-9.6441D-08	3.5747D-08	-7.2748D-09
-1.1729D-08	6.3288D-08	4.2121D-08	2.1996D-07	-3.7418D-08	6.1593D-08
-2.3524D-07	-8.6126D-08	-5.2910D-07	-2.8323D-07	-1.9394D-07	-1.1988D-07
4.4863D-08	-4.3481D-08	5.1724D-08	-9.6441D-08	3.5747D-08	-7.2748D-09
-1.1729D-08	6.3288D-08	4.2121D-08	2.1996D-07	-3.7418D-08	6.1593D-08
-2.3524D-07	-8.6126D-08	-5.2910D-07	-2.8323D-07	-1.9394D-07	-1.1988D-07
6.1350D-09	-2.9059D-08	-9.3600D-09	-9.8021D-08	3.6676D-08	1.5288D-09
-2.9866D-08	-2.7010D-08	-9.7714D-08	-1.1852D-07	3.6652D-08	6.8360D-08
1.4592D-08	-9.8832D-09	4.7108D-07	-2.7549D-07	2.0477D-07	-1.6395D-07
6.1350D-09	-2.9059D-08	-9.3600D-09	-9.8021D-08	3.6676D-08	1.5288D-09
-2.9866D-08	-2.7010D-08	-9.7714D-08	-1.1852D-07	3.6652D-08	6.8360D-08
1.4592D-08	-9.8832D-09	4.7108D-07	-2.7549D-07	2.0477D-07	-1.6395D-07
-1.7079D-08	7.4532D-08	-1.3073D-07	8.0131D-08	-2.4550D-08	-1.2103D-09
2.7083D-08	-9.4998D-08	-1.0813D-08	-2.7994D-07	8.7521D-08	-9.0550D-08
-8.3017D-08	5.4267D-08	-4.7851D-08	2.1042D-07	-6.2930D-08	1.1243D-07
-2.6253D-08	8.6509D-08	-1.6260D-07	4.9699D-08	3.3086D-08	1.0069D-08
-3.5749D-08	8.0724D-08	-1.1930D-07	9.4919D-08	-1.0695D-08	-1.2224D-08
1.5182D-08	-1.2300D-07	7.8957D-09	-2.1538D-07	-3.8720D-10	-7.9171D-09
-4.5441D-08	1.2296D-07	-2.1628D-08	2.3081D-07	-2.2910D-10	3.2406D-08
-4.5463D-08	7.1790D-08	-1.6881D-07	-1.2033D-09	1.0336D-07	-7.8469D-09
-1.0597D-07	1.4057D-08	-1.8784D-07	4.6128D-08	-1.9773D-08	-3.1763D-08
1.8670D-08	-8.7619D-08	4.7027D-08	-1.3745D-07	-8.6328D-08	-5.9368D-08
-1.4827D-08	1.0990D-07	-8.2400D-09	2.2363D-07	5.8185D-08	7.1685D-08
-1.1955D-07	7.3771D-09	-2.2400D-07	4.2974D-09	3.9643D-08	-4.1900D-08
-1.4328D-07	-4.6470D-08	-2.3401D-07	-5.7492D-08	-5.6124D-08	-2.8415D-08

1.7842D-08	-1.3166D-08	2.6984D-08	-1.0130D-07	-9.9475D-08	-1.0779D-07
-9.0915D-09	1.2465D-08	3.0303D-08	1.8044D-07	7.8910D-08	1.2207D-07
-1.5394D-07	-1.5887D-08	-2.2348D-07	-7.5335D-09	-5.0307D-08	-5.0161D-08
-1.1448D-07	-2.8359D-08	-2.6402D-07	-9.1500D-08	-8.1577D-08	1.0906D-08
1.7081D-08	1.5115D-08	-1.2152D-09	-1.3996D-07	-9.3155D-09	-1.4791D-07
-3.4802D-08	-4.8346D-08	-6.0134D-09	1.3424D-07	9.9055D-09	1.6102D-07
-1.1325D-07	3.4628D-08	-2.3254D-07	5.9373D-09	-1.0908D-07	1.7836D-08
-6.1302D-09	-5.7473D-09	-1.5887D-07	-4.0923D-08	-5.7604D-08	2.2393D-08
-3.5140D-09	-1.1750D-08	-4.0528D-08	-2.1181D-07	9.2794D-08	-1.1476D-07
-5.7480D-08	-6.8434D-08	-1.3203D-08	1.1076D-07	-7.3586D-08	1.2604D-07
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-1.2034D-07	6.0505D-08	-2.2985D-07	4.0871D-08	-3.3394D-08	1.6737D-08
5.4679D-08	-7.3734D-08	2.6909D-08	-2.2282D-07	1.4657D-08	-1.2613D-07
-1.0669D-07	6.1186D-08	-6.9684D-08	2.0619D-07	5.8493D-09	1.5143D-07
-1.5739D-07	9.8466D-08	-2.6392D-07	6.1094D-08	2.9324D-09	3.2757D-08
-9.3020D-09	-1.6452D-08	-2.7239D-08	-4.8878D-08	1.8907D-08	5.4210D-11
1.4670D-07	-1.7364D-07	3.1599D-07	-3.2023D-07	1.6816D-07	-2.1403D-08
1.8600D-10	2.5829D-07	2.1767D-07	9.0421D-07	-1.7863D-07	2.0776D-07
3.8343D-08	2.8754D-07	-7.1847D-09	9.2904D-07	-7.9545D-09	1.7834D-07
-2.4121D-07	-3.5776D-08	-9.1827D-07	1.4816D-08	-3.1841D-07	2.6713D-08
3.9059D-07	2.6065D-07	1.0750D-06	1.0217D-06	-3.2946D-07	-2.8244D-08
-4.1804D-07	-4.8684D-07	-1.0847D-06	-1.4049D-06	6.7690D-07	2.2538D-07
3.8356D-07	2.5831D-07	1.0580D-06	1.0156D-06	-3.2551D-07	-2.4169D-08
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9.9522D-08	3.0987D-07	8.2860D-08	5.7273D-07	1.0673D-07	1.0578D-06
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9.5548D-08	5.9425D-07	6.2681D-08	1.6731D-06	1.0947D-07	1.0030D-06
3.0654D-07	1.6589D-07	7.8529D-07	4.7216D-07	2.3187D-07	2.0813D-07
-6.4663D-08	1.7366D-07	-3.9368D-07	-9.7299D-08	2.0209D-07	3.8763D-07
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-3.7456D-07	-9.1405D-08	-1.3762D-06	-7.4823D-07	8.4565D-07	6.7444D-07
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-1.7404D-07	2.7952D-07	-3.4444D-07	5.7865D-07	1.2018D-07	2.4947D-07
-3.1935D-07	9.9004D-09	-6.5738D-07	1.5991D-08	-3.3617D-08	9.5698D-09
-6.3342D-07	4.0918D-07	-5.5241D-07	3.7366D-07	-1.9199D-07	3.8985D-07
-8.3251D-08	7.4849D-08	-5.9687D-08	5.1004D-08	-2.8432D-08	1.0485D-07
-1.2571D-06	9.2780D-07	-1.0444D-06	6.7710D-07	-3.5221D-07	1.0108D-06
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-3.1283D-07	2.6519D-07	-3.0808D-07	1.9043D-07	-9.4105D-08	1.6852D-07

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-9.5954D-07	7.0370D-07	-7.9431D-07	5.0969D-07	-2.6616D-07	7.9556D-07
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-1.5336D-08	-2.3752D-08	-3.9770D-08	-6.3817D-08	-3.8473D-08	-1.9324D-08
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-5.3768D-07	4.4458D-07	-5.4010D-07	3.8285D-07	-1.7975D-07	5.1923D-07
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2.6995D-07	-1.8496D-07	2.1633D-07	-1.4047D-07	4.1231D-08	1.8477D-07
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-4.1451D-07	3.2985D-07	-3.4902D-07	2.4259D-07	-1.0406D-07	1.6116D-07
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-1.2837D-04	-2.4893D-04	4.2555D-04	-2.6028D-04	1.9726D-04	-1.7439D-03
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1.7200D-03	7.1750D-04	8.1645D-04	1.0751D-03	2.3353D-04	1.0751D-03
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-5.5642D-04	-5.0277D-05	-2.0064D-03	3.1843D-03	-9.1595D-05	-1.8094D-03
1.8573D-03	-1.6436D-03	1.4644D-03	-1.1358D-03	-3.1227D-04	-7.9547D-04
-1.6075D-03	4.0663D-04	-1.2469D-03	3.0551D-04	-2.2291D-04	1.5037D-03
2.8981D-03	-7.1111D-04	1.6971D-03	-7.5047D-04	-3.8930D-05	-1.6257D-03
2.9338D-03	-2.6403D-03	2.3080D-03	-1.5422D-03	-1.0164D-03	-1.5222D-03
1.2901D-05	9.4296D-06	-9.1638D-05	-1.5319D-04	-1.0440D-05	1.1545D-05
-7.1292D-04	1.0159D-03	5.4294D-04	6.7496D-04	-4.6585D-04	1.0897D-03
3.9959D-04	-6.4814D-04	1.8031D-04	-6.8349D-05	1.0745D-03	2.4091D-04
-2.0078D-03	1.5648D-03	1.1479D-03	-4.8826D-03	4.9878D-04	6.6456D-03
-3.5618D-03	2.0227D-03	6.0164D-03	-1.2786D-03	8.1664D-05	-1.3374D-03
-1.5732D-03	-5.0981D-04	-5.5144D-04	-1.0048D-03	1.4450D-03	1.0096D-03
1.9598D-03	1.9762D-03	1.7382D-03	2.7808D-03	-1.9037D-03	1.2407D-04
-1.5578D-03	-4.4176D-04	-5.5984D-04	-1.0641D-03	1.3848D-03	9.5105D-04
-6.4131D-04	-2.1648D-03	-7.6448D-04	-1.6897D-03	2.9706D-03	2.0903D-04
6.5850D-04	3.0602D-03	1.7869D-03	3.4908D-03	-2.7905D-03	1.4110D-03
8.2534D-04	-2.1282D-05	3.8484D-04	2.6989D-04	3.8105D-04	3.0696D-04
-2.0165D-02	-1.0132D-03	1.0871D-03	1.3571D-03	-5.8021D-03	-3.6979D-03
-1.0137D-03	-2.1720D-02	1.2035D-03	1.5085D-05	2.2752D-04	-9.2896D-03
1.1002D-03	1.1953D-03	-2.9996D-02	-9.4529D-03	-2.2138D-03	-4.1774D-03
1.3485D-03	2.2589D-05	-9.4540D-03	-3.9880D-02	-1.5135D-03	-1.1872D-03
-5.8033D-03	2.2789D-04	-2.2172D-03	-1.5112D-03	-2.1745D-02	-3.8722D-03
-3.7003D-03	-9.2905D-03	-4.1690D-03	-1.1931D-03	-3.8724D-03	-3.2258D-02
-1.3631D-03	-2.2234D-03	-2.9055D-03	7.1734D-03	1.9914D-03	-3.3860D-03
-4.8256D-03	-2.0184D-03	-4.0104D-03	-7.7379D-03	-4.2224D-03	-1.0596D-02
-7.7499D-03	-4.0962D-03	4.8410D-04	-2.4066D-03	-8.5446D-03	-9.7170D-03
-3.4825D-05	-7.3020D-03	-4.7174D-04	-3.7236D-03	-3.5377D-03	-1.2457D-02
-5.8943D-05	-3.7182D-03	-8.8679D-03	-6.5499D-03	-3.9590D-03	-6.4869D-03
-1.3341D-03	-3.8942D-03	3.6783D-03	-2.2703D-03	-5.1636D-04	-5.0710D-03
1.6021D-03	-3.5121D-03	1.1709D-04	-1.4202D-03	2.5711D-03	7.3749D-04
-1.6068D-03	-1.7224D-03	3.2994D-04	3.5833D-04	-2.1731D-03	2.2385D-03
6.4620D-04	2.2739D-03	-2.1882D-04	-4.8352D-04	1.8241D-03	1.7357D-03
3.6859D-03	1.6702D-05	1.2037D-03	3.7138D-04	2.7393D-03	-8.9487D-04
-2.2057D-04	-2.2320D-03	3.7495D-04	-2.4632D-03	-2.3617D-03	1.0539D-03
1.6046D-03	1.5981D-03	2.1715D-03	1.0325D-03	-2.3135D-03	1.9425D-03

Columns 7 thru 12

-1.7523D-07	4.7100D-11	8.2740D-08	-1.2467D-08	2.0159D-07	-1.3105D-07
8.8378D-10	4.3100D-08	1.5214D-08	2.4354D-08	5.1404D-09	6.8569D-08
-3.3509D-10	5.1545D-07	4.9621D-09	2.3783D-07	-1.0251D-08	5.8929D-07
-1.7523D-07	4.7100D-11	8.2740D-08	-1.2467D-08	2.0159D-07	-1.3105D-07
8.8378D-10	4.3100D-08	1.5214D-08	2.4354D-08	5.1404D-09	6.8569D-08
-3.3509D-10	5.1545D-07	4.9621D-09	2.3783D-07	-1.0251D-08	5.8929D-07
1.5393D-07	-1.5010D-08	4.1268D-09	2.6627D-08	-8.4888D-09	9.3134D-08
-1.5446D-07	1.0455D-07	2.0870D-08	-3.0488D-08	9.0231D-08	-1.2470D-07

-5.1870D-07	-2.9252D-07	1.8049D-08	1.6038D-08	-4.4795D-07	-2.4490D-07
1.5393D-07	-1.5010D-08	4.1268D-09	2.6627D-08	-8.4888D-09	9.3134D-08
-1.5446D-07	1.0455D-07	2.0870D-08	-3.0488D-08	9.0231D-08	-1.2470D-07
-5.1870D-07	-2.9252D-07	1.8049D-08	1.6038D-08	-4.4795D-07	-2.4490D-07
1.5558D-07	1.3319D-08	4.1642D-08	3.7219D-08	4.8230D-08	9.0634D-08
1.5564D-07	1.1328D-07	4.3139D-09	5.9140D-08	-5.1297D-08	2.1316D-07
5.1541D-07	-3.2022D-07	2.3915D-07	-1.0049D-07	5.4536D-07	-2.9758D-07
1.5558D-07	1.3319D-08	4.1642D-08	3.7219D-08	4.8230D-08	9.0634D-08
1.5564D-07	1.1328D-07	4.3139D-09	5.9140D-08	-5.1297D-08	2.1316D-07
5.1541D-07	-3.2022D-07	2.3915D-07	-1.0049D-07	5.4536D-07	-2.9758D-07
-2.1071D-07	3.6525D-10	-1.3997D-07	-3.4278D-08	-2.1827D-07	-5.9843D-08
1.2641D-07	-2.0474D-07	-2.2213D-08	-9.9022D-08	-5.2625D-08	-1.4448D-07
-4.6663D-08	2.2217D-07	8.9474D-09	1.2103D-07	5.3960D-09	2.2318D-07
-1.5448D-07	4.1269D-09	-1.6121D-07	-2.9603D-08	-2.6139D-07	-2.0089D-08
-2.2983D-07	-1.2474D-08	-4.0573D-08	-8.9681D-08	-1.2831D-07	-9.8449D-08
-3.4676D-09	-1.4046D-07	-2.0968D-08	-1.2438D-07	-1.1067D-08	-2.1485D-07
4.4949D-09	1.3608D-07	5.1170D-08	1.2312D-07	2.4303D-08	2.3014D-07
-9.7801D-08	-6.0863D-09	-4.8490D-08	-7.6806D-08	-1.7857D-07	-8.3683D-10
-2.0361D-07	-3.4507D-08	-2.8228D-09	-8.3766D-08	-1.2493D-07	-8.0800D-08
-1.3146D-07	-1.7981D-07	-1.4051D-08	-7.3475D-08	2.8375D-08	-2.6108D-07
4.9536D-08	1.8706D-07	5.8277D-08	2.3962D-08	2.1837D-08	1.8522D-07
-1.4605D-07	-3.6221D-08	-5.6202D-09	-9.2944D-08	-1.5261D-07	-4.8326D-08
-1.4334D-07	-2.3626D-08	-4.2379D-09	1.6216D-09	-1.6232D-07	4.2072D-08
-1.1469D-07	-1.9484D-07	-4.3613D-09	-1.1248D-08	3.5802D-08	-2.0773D-07
2.2752D-08	1.9850D-07	6.1118D-08	-6.8347D-08	1.9229D-08	1.0764D-07
-2.0366D-07	-4.4004D-08	4.9370D-09	-5.8951D-08	-1.2633D-07	-1.1834D-08
-1.1181D-07	9.7467D-09	-1.1005D-07	4.2242D-08	-2.6467D-07	1.0231D-07
-8.4055D-09	-2.4201D-07	-4.8272D-08	1.5196D-09	-2.3984D-08	-1.4444D-07
8.8601D-09	2.5734D-07	6.6759D-08	-3.3840D-08	3.1959D-08	1.3901D-07
-2.2273D-07	1.4955D-08	-1.0463D-07	-1.1245D-08	-2.2705D-07	1.3033D-08
-1.4639D-07	1.5378D-08	-1.5009D-07	4.2431D-08	-2.4246D-07	5.6290D-08
1.0535D-07	-2.0127D-07	-3.4440D-08	-2.1904D-08	-4.0336D-08	-1.0385D-07
-1.5083D-08	2.0495D-07	1.8810D-08	1.7831D-08	-2.4801D-08	1.7848D-07
-2.0589D-07	3.5584D-08	-1.5793D-07	1.4882D-08	-2.2774D-07	8.6503D-09
-1.7228D-07	1.2984D-08	-1.1615D-07	-3.6909D-08	-2.2695D-07	-2.1883D-08
3.3497D-08	-2.3028D-07	-2.8302D-08	-3.6855D-08	-2.7307D-08	-1.4787D-07
3.1159D-09	2.5184D-07	3.0923D-08	1.1023D-08	8.2104D-09	1.6718D-07
-1.6675D-07	2.5099D-08	-1.2374D-07	-6.6652D-08	-2.4089D-07	-3.3995D-08
5.6082D-08	7.6500D-10	-9.5233D-09	1.6400D-08	-2.8620D-08	4.8201D-08
7.3212D-07	-1.3214D-08	1.3347D-07	1.4616D-07	3.0925D-07	2.8342D-07
-5.2799D-07	4.6339D-07	1.3066D-07	-5.4822D-08	2.7674D-07	-4.2038D-08
5.3972D-09	8.9587D-07	-8.0434D-08	2.7447D-07	-2.7727D-08	8.9810D-07
-9.2598D-07	1.5965D-08	-2.2523D-07	6.4057D-08	-9.2055D-07	1.9523D-08
-8.0481D-07	-3.2023D-08	3.8519D-07	-2.8254D-07	1.0964D-06	-1.0401D-06
2.1198D-06	5.0032D-07	-3.0263D-07	6.8089D-07	-1.0743D-06	2.2365D-06
-7.9939D-07	-2.3661D-08	3.8611D-07	-2.7467D-07	1.0875D-06	-1.0253D-06
-2.1286D-06	4.5623D-07	3.9385D-07	-4.9525D-07	1.0889D-06	-1.4057D-06
2.8781D-06	1.8336D-08	-2.2194D-07	7.4101D-07	-7.7727D-07	2.1347D-06
1.2113D-08	4.6923D-07	4.3040D-08	9.5573D-08	5.9747D-09	4.2178D-07
9.8438D-08	9.5568D-08	3.0642D-07	-6.4823D-08	7.9178D-07	-3.7441D-07
-7.8984D-07	5.9437D-07	1.6609D-07	1.7380D-07	4.9649D-07	-9.1250D-08

5.3419D-08	6.2558D-08	7.8545D-07	-3.9389D-07	2.4797D-06	-1.3761D-06
-2.8216D-06	1.6733D-06	4.7227D-07	-9.7278D-08	1.4767D-06	-7.4816D-07
1.7282D-06	1.0962D-07	2.3186D-07	2.0206D-07	1.5015D-07	8.4563D-07
9.2654D-08	1.0028D-06	2.0819D-07	3.8757D-07	1.5997D-07	6.7424D-07
5.3018D-06	1.1067D-07	1.1511D-07	8.2617D-07	5.1206D-08	2.8382D-06
1.1067D-07	2.1746D-06	1.5742D-07	6.7933D-07	1.3517D-07	1.7770D-06
1.1498D-07	1.5748D-07	1.0638D-06	2.7050D-08	1.2163D-06	-3.0129D-07
8.2613D-07	6.7939D-07	2.7212D-08	1.0251D-06	-3.0875D-07	1.5246D-06
5.1111D-08	1.3507D-07	1.2165D-06	-3.0894D-07	3.0133D-06	-1.3554D-06
2.8382D-06	1.7772D-06	-3.0134D-07	1.5247D-06	-1.3554D-06	4.4746D-06
-3.3762D-07	-5.8236D-07	-3.0970D-07	-2.7312D-08	-3.8987D-07	-4.2532D-07
3.1281D-07	-6.0897D-07	7.1928D-09	-4.8249D-08	2.7297D-07	-4.6515D-07
5.3656D-07	1.3070D-08	3.6288D-07	1.7001D-08	7.0138D-07	1.3853D-08
1.9176D-07	5.7180D-07	1.7045D-07	2.8454D-07	3.4719D-07	5.6986D-07
-1.7943D-07	5.2440D-07	-3.9315D-08	1.4178D-08	-2.8094D-07	4.5185D-07
-5.2776D-07	-1.1491D-08	-1.6537D-07	-2.3766D-07	-5.6565D-07	-9.9170D-08
-2.2644D-07	3.6299D-07	-4.4106D-07	6.1972D-08	-3.3943D-07	-1.8214D-08
-1.4306D-08	8.6746D-08	-1.1401D-07	9.2452D-10	-7.3912D-08	-1.4605D-08
-2.3540D-07	8.4093D-07	-1.0435D-06	-3.5675D-09	-7.1954D-07	-9.4922D-08
-2.2644D-07	3.6299D-07	-4.4106D-07	6.1972D-08	-3.3943D-07	-1.8214D-08
-1.4306D-08	8.6746D-08	-1.1401D-07	9.2452D-10	-7.3912D-08	-1.4605D-08
-2.3540D-07	8.4093D-07	-1.0435D-06	-3.5675D-09	-7.1954D-07	-9.4922D-08
-5.9009D-08	1.6600D-07	-2.0282D-07	3.8787D-08	-1.7234D-07	5.5132D-08
1.3773D-07	-4.1114D-07	5.0479D-07	-4.8942D-08	4.0647D-07	-5.1637D-08
-1.7998D-07	6.4188D-07	-8.4562D-07	-1.1700D-08	-5.9156D-07	-9.4140D-08
-5.9009D-08	1.6600D-07	-2.0282D-07	3.8787D-08	-1.7234D-07	5.5132D-08
1.3773D-07	-4.1114D-07	5.0479D-07	-4.8942D-08	4.0647D-07	-5.1637D-08
-1.7998D-07	6.4188D-07	-8.4562D-07	-1.1700D-08	-5.9156D-07	-9.4140D-08
4.4964D-08	-1.0702D-07	1.4954D-07	-4.5377D-08	7.8068D-08	-2.0779D-09
2.4601D-08	-3.5794D-08	3.9489D-08	-2.0388D-08	2.3944D-10	2.1011D-08
4.0359D-07	-1.2358D-06	1.6029D-06	-1.5946D-07	1.1130D-06	4.0480D-08
4.4964D-08	-1.0702D-07	1.4954D-07	-4.5377D-08	7.8068D-08	-2.0779D-09
2.4601D-08	-3.5794D-08	3.9489D-08	-2.0388D-08	2.3944D-10	2.1011D-08
4.0359D-07	-1.2358D-06	1.6029D-06	-1.5946D-07	1.1130D-06	4.0480D-08
-3.3116D-09	2.0733D-07	-2.3164D-07	-6.5719D-08	-1.6472D-07	-3.2913D-08
-2.1070D-07	4.8373D-07	-5.3981D-07	-5.3439D-08	-4.5105D-07	-2.8093D-08
3.4741D-07	-7.8839D-07	8.7638D-07	5.2981D-08	7.3138D-07	2.6911D-08
4.2416D-08	1.3086D-07	-1.3542D-07	-8.0214D-08	-7.2410D-08	-4.4108D-08
-3.2690D-07	4.5273D-07	-4.9895D-07	5.5030D-08	-3.7986D-07	-1.8412D-08
8.6077D-08	-2.2450D-07	2.4306D-07	-2.9154D-08	1.9335D-07	-8.9974D-09
-8.0466D-08	1.8187D-07	-2.0794D-07	6.4755D-08	-1.7204D-07	3.6301D-08
-3.6324D-07	5.0810D-07	-5.5688D-07	4.6386D-08	-4.2428D-07	-1.2493D-08
-2.4157D-07	3.6484D-07	-4.0447D-07	1.2177D-07	-3.9799D-07	1.1481D-07
1.5789D-07	-2.1725D-07	2.1446D-07	-3.7113D-08	2.0086D-07	-3.8729D-08
-1.7889D-07	2.3257D-07	-2.4099D-07	5.5761D-08	-2.1992D-07	4.9916D-08
-2.9332D-07	4.4219D-07	-4.9896D-07	1.5841D-07	-4.7709D-07	1.4419D-07
-1.3651D-07	3.3925D-07	-4.4348D-07	7.5689D-08	-3.8908D-07	6.7907D-08
1.0500D-07	-3.3534D-07	4.5215D-07	-9.1342D-08	3.8494D-07	-1.2063D-07
-1.2251D-07	4.0275D-07	-5.8729D-07	1.4645D-07	-4.5611D-07	1.2627D-07
-1.5705D-07	3.3103D-07	-4.4173D-07	1.3211D-07	-3.7916D-07	9.1440D-08
1.1564D-07	-3.1366D-07	3.6569D-07	-4.6287D-08	3.0877D-07	-4.4589D-08

1.4577D-07	-4.1832D-07	4.9796D-07	9.7798D-08	4.3300D-07	5.4520D-08
-1.6720D-07	4.9254D-07	-6.1232D-07	-1.0310D-07	-5.2409D-07	-6.0451D-08
2.3190D-07	-5.9414D-07	6.9405D-07	-6.2346D-08	5.8828D-07	-6.0956D-08
-8.9842D-08	3.1507D-07	-3.5496D-07	7.8745D-09	-2.8750D-07	3.2351D-08
1.3262D-07	-2.0634D-07	3.0796D-07	-1.6236D-08	2.1741D-07	4.6382D-08
-1.2089D-07	2.0707D-07	-3.3112D-07	-1.9584D-09	-2.4070D-07	-3.6239D-08
-9.8756D-08	3.0692D-07	-3.4331D-07	1.5063D-08	-2.6970D-07	3.1294D-08
4.3447D-07	-8.8900D-07	1.0374D-06	-9.0778D-08	8.6542D-07	-5.9546D-08
-2.7527D-07	6.3291D-07	-7.7176D-07	6.7759D-08	-6.3341D-07	5.4976D-08
4.8424D-07	-1.0691D-06	1.2674D-06	-1.1302D-07	1.0389D-06	-7.1807D-08
6.7441D-07	-1.4274D-06	1.6752D-06	-1.2455D-07	1.3972D-06	-7.9850D-08
3.0072D-09	2.1901D-09	9.7484D-09	-2.4751D-08	-4.9665D-09	3.3921D-09
1.0251D-07	-1.4892D-07	2.4843D-07	-8.7335D-08	6.3900D-08	7.3784D-08
-7.8168D-08	7.5223D-08	-2.1064D-07	9.5545D-08	-4.6737D-08	-7.5379D-08
-2.8635D-07	9.4283D-07	-1.1617D-06	5.4074D-08	-8.2134D-07	-4.4332D-08
-4.3464D-07	1.4020D-06	-1.8154D-06	9.9878D-08	-1.2811D-06	-8.7735D-08
-1.6233D-07	-1.5381D-07	2.1809D-07	-5.4238D-09	2.0073D-07	-1.7259D-07
3.6000D-07	9.0293D-08	-1.7002D-07	-3.5831D-08	-2.7523D-07	3.2780D-07
-1.6096D-07	-1.0695D-07	1.5960D-07	-6.0791D-10	1.6046D-07	-1.5889D-07
-3.6299D-07	1.3352D-07	-3.2020D-07	1.8822D-07	4.4447D-08	-3.2557D-07
4.5518D-07	-1.0612D-07	2.2654D-07	-1.8332D-07	-1.4758D-07	3.9816D-07
2.2871D-08	6.2327D-08	-1.7790D-07	6.0246D-08	-8.4973D-08	1.6978D-08
-1.3597D-06	4.0555D-06	-5.5450D-06	4.6184D-07	-3.4484D-06	-8.0721D-07
2.0495D-07	-2.9775D-06	4.0213D-06	-2.4039D-07	2.6523D-06	-1.6703D-07
-2.0028D-07	1.4900D-06	-2.2683D-06	3.3964D-08	-1.2707D-06	-3.9560D-07
2.9601D-08	-1.0194D-06	1.6622D-06	-4.8577D-07	6.6960D-07	1.1897D-07
-4.4789D-07	1.3323D-06	-1.7559D-06	3.9727D-08	-1.5686D-06	2.9321D-07
6.4576D-07	-1.9064D-06	3.2594D-06	-5.3257D-07	2.0138D-06	1.6573D-08
6.5222D-08	-7.9104D-07	6.3069D-07	3.4393D-07	6.5172D-07	-9.6873D-08
9.2998D-08	-1.3355D-07	1.1122D-06	-5.4867D-07	4.2482D-07	-6.4915D-08
-1.0995D-06	2.6349D-06	-3.4214D-06	9.1514D-07	-1.8205D-06	4.9852D-08
5.8636D-07	-7.0590D-07	1.0999D-06	-6.0130D-07	6.5785D-07	1.0619D-07
-3.3186D-08	1.7193D-08	7.3413D-08	3.8939D-07	4.9804D-07	2.3768D-07
-4.5606D-07	7.8160D-07	-9.8695D-07	2.2897D-07	-5.1110D-07	-1.2648D-07
2.1830D-07	-7.6493D-07	9.9837D-07	2.4392D-10	8.7457D-07	-8.7648D-08
-2.3659D-08	1.4883D-07	-3.8051D-08	7.6426D-08	-9.4962D-08	1.6060D-07
-2.0590D-07	9.4158D-08	-1.7453D-07	9.2302D-08	-1.7788D-07	-7.7862D-09
4.6012D-07	-8.4967D-07	8.9760D-07	5.3963D-08	6.9235D-07	1.0109D-07
-3.2250D-07	2.5298D-07	-2.8118D-07	1.8394D-07	-2.0648D-07	7.4482D-08
-1.6093D-07	2.4135D-07	-3.2582D-07	2.0572D-07	-3.5186D-07	2.4677D-07
6.1135D-03	-6.0647D-06	1.6086D-05	-7.2178D-04	-1.0082D-03	-7.7011D-04
-3.9754D-05	2.4255D-03	3.8093D-04	-1.4338D-04	-1.6279D-04	-2.2778D-04
1.9073D-04	-2.4926D-03	2.1544D-03	2.1288D-04	7.8494D-04	-2.3457D-03
6.1135D-03	-6.0647D-06	1.6086D-05	-7.2178D-04	-1.0082D-03	-7.7011D-04
-3.9754D-05	2.4255D-03	3.8093D-04	-1.4338D-04	-1.6279D-04	-2.2778D-04
1.9073D-04	-2.4926D-03	2.1544D-03	2.1288D-04	7.8494D-04	-2.3457D-03
8.9683D-05	3.2240D-04	-1.8580D-03	1.2202D-04	3.2316D-03	-1.5509D-03
-1.7319D-04	-1.0079D-03	3.9768D-04	-2.0994D-03	-1.4259D-03	5.3883D-03
2.1957D-03	3.8572D-04	-4.9590D-03	-2.8687D-03	2.1068D-03	9.2666D-04
8.9683D-05	3.2240D-04	-1.8580D-03	1.2202D-04	3.2316D-03	-1.5509D-03
-1.7319D-04	-1.0079D-03	3.9768D-04	-2.0994D-03	-1.4259D-03	5.3883D-03

2.1957D-03	3.8572D-04	-4.9590D-03	-2.3687D-03	2.1068D-03	9.2666D-04
-2.0994D-05	-7.0563D-05	-3.7738D-04	6.3255D-04	-8.4526D-04	-2.8689D-04
2.5577D-04	-1.1830D-03	-3.2972D-04	3.3460D-04	-6.4864D-04	-1.4834D-04
-2.5527D-03	1.9946D-03	2.5759D-04	1.1349D-03	-2.7201D-03	1.3100D-03
-2.0994D-05	-7.0563D-05	-3.7738D-04	6.3255D-04	-8.4526D-04	-2.8689D-04
2.5577D-04	-1.1830D-03	-3.2972D-04	3.3460D-04	-6.4864D-04	-1.4834D-04
-2.5527D-03	1.9946D-03	2.5759D-04	1.1349D-03	-2.7201D-03	1.3100D-03
-7.3801D-04	-6.6298D-04	2.3187D-03	4.3704D-04	1.4989D-03	1.0612D-04
-7.5532D-04	5.3108D-04	-1.5853D-04	1.8593D-03	-3.4365D-04	1.4699D-03
1.5559D-03	-4.7649D-04	7.5390D-04	-1.9578D-03	3.9619D-04	-1.5271D-03
-1.4259D-04	-3.4792D-04	2.3385D-03	1.9368D-04	1.9252D-03	3.4295D-04
1.4532D-04	4.4537D-04	-3.7283D-04	1.3595D-03	-6.3292D-04	4.8280D-04
1.0549D-05	-1.2337D-03	8.2913D-04	1.6414D-03	8.3955D-05	1.3803D-03
9.7065D-06	3.6679D-03	-1.5694D-03	-1.8979D-03	-1.8375D-04	-1.4925D-03
3.4275D-03	2.0896D-04	-9.5562D-04	1.3978D-03	-7.5890D-04	7.6412D-04
-1.0897D-03	1.7999D-03	-1.7658D-03	9.5733D-04	-1.5694D-03	4.8749D-04
7.2218D-04	-6.2013D-04	6.0936D-04	-6.1528D-04	1.1106D-03	2.6026D-05
-1.3774D-03	1.0286D-03	-1.9741D-03	2.0516D-03	-2.0805D-04	-4.4263D-04
-5.4253D-04	1.3909D-03	-2.2558D-03	9.5068D-04	-1.8660D-03	7.4320D-04
6.0440D-04	7.6721D-04	-7.5308D-04	-1.5030D-03	-1.0359D-03	-6.1982D-04
1.2401D-03	-2.3967D-05	-1.1976D-03	1.3420D-03	-4.3119D-04	-9.8514D-05
-1.4653D-03	-1.3064D-04	-4.2414D-04	7.7401D-04	2.9491D-03	-1.7529D-03
5.0589D-04	8.0383D-04	-6.5447D-04	4.1217D-04	-2.0453D-03	-3.1035D-03
1.5313D-03	-4.4192D-04	1.7893D-04	-2.9013D-04	6.4431D-04	5.9643D-05
2.2647D-04	1.1083D-03	9.9180D-04	-1.0905D-03	2.3363D-04	-1.2694D-03
-2.1692D-04	-1.5014D-03	-1.0712D-03	2.3803D-03	-3.7179D-04	1.0325D-03
1.5566D-03	-7.4128D-04	-3.8870D-05	1.2013D-03	8.3399D-04	-9.7734D-04
7.1697D-04	-5.5567D-04	1.9822D-03	-4.5200D-04	1.0007D-03	-9.0156D-04
-1.0632D-03	2.9081D-04	3.0549D-04	-3.5407D-04	-2.0748D-04	-1.2094D-04
1.4113D-03	-3.2650D-04	2.8832D-04	1.1655D-03	1.7554D-04	3.8299D-04
5.7631D-04	-7.1038D-04	2.3773D-03	-3.6361D-04	1.1262D-03	-1.0222D-03
-7.1594D-05	-6.9683D-04	1.5492D-03	6.7333D-04	1.1044D-03	4.3242D-04
-5.4627D-05	1.0543D-03	5.3677D-05	-2.5465D-04	-1.3261D-04	-7.6966D-05
1.4062D-04	-1.4637D-03	4.4917D-04	1.2053D-03	2.6866D-04	3.1547D-04
-2.4553D-05	-1.0175D-03	1.5160D-03	1.0512D-03	1.4213D-03	6.2834D-04
1.7324D-04	1.7725D-06	-1.7335D-06	-1.8466D-05	-9.0143D-05	1.5193D-04
1.7138D-04	8.7219D-04	-3.4368D-06	-1.5862D-04	1.1327D-03	1.2359D-04
9.6466D-04	1.3524D-03	6.3603D-04	8.5630D-04	7.4036D-04	1.6746D-03
5.7158D-04	-5.3208D-03	3.7376D-03	1.7182D-03	2.2078D-04	-4.1706D-03
4.5617D-03	-1.0165D-03	-4.6103D-03	-3.0228D-03	5.3859D-03	5.4319D-04
1.9940D-03	9.3962D-04	-7.0943D-04	1.5328D-03	1.1825D-04	1.5773D-03
-2.8627D-03	8.0882D-04	1.7975D-03	-1.9462D-03	2.1669D-03	-1.3563D-03
1.9792D-03	7.7468D-04	-8.0298D-04	1.2212D-03	-3.7460D-04	1.9103D-03
2.9729D-03	1.2075D-03	-1.8977D-04	2.4586D-03	-6.0636D-04	3.4185D-03
-2.4693D-03	9.4200D-04	1.4362D-03	-2.2484D-03	2.4689D-03	-2.2194D-03
4.0333D-04	1.2164D-03	9.0630D-04	3.0690D-04	9.8108D-04	9.9303D-04
-1.3746D-03	-4.8147D-03	-7.7478D-03	-3.3830D-05	-7.0030D-05	-1.3254D-03
-2.2155D-03	-2.0256D-03	-4.0966D-03	-7.3013D-03	-3.7103D-03	-3.9008D-03
-2.9136D-03	-4.0099D-03	4.9394D-04	-4.7133D-04	-8.8714D-03	3.6863D-03
7.1781D-03	-7.7385D-03	-2.4128D-03	-3.7235D-03	-6.5483D-03	-2.2758D-03
1.9884D-03	-4.2204D-03	-8.5448D-03	-3.5374D-03	-3.9615D-03	-5.1507D-04

-3.3774D-03	-1.0602D-02	-9.7168D-03	-1.2455D-02	-6.4768D-03	-5.0758D-03
-4.5215D-02	-1.4528D-03	-2.3923D-03	1.5126D-04	-4.0762D-03	-8.6719D-03
-1.4466D-03	-3.2737D-02	-6.3413D-03	-5.5891D-03	-5.2469D-03	-1.1020D-02
-2.4003D-03	-6.3353D-03	-2.9478D-02	-5.6323D-03	-8.4292D-03	-6.2408D-03
1.5059D-04	-5.5901D-03	-5.6333D-03	-2.4342D-02	-5.8133D-03	-8.2418D-04
-4.0801D-03	-5.2509D-03	-8.4212D-03	-5.8130D-03	-3.5617D-02	4.0514D-03
-8.6738D-03	-1.1015D-02	-6.2465D-03	-8.2344D-04	4.0465D-03	-4.3305D-02
2.3067D-03	1.3425D-03	1.7294D-03	-2.2703D-03	-3.3608D-04	8.4786D-06
-2.0446D-03	2.7643D-03	-4.5569D-04	-2.3552D-03	8.7519D-04	-5.1483D-04
8.7705D-04	-3.3471D-04	-3.2832D-03	1.0261D-03	-3.4325D-03	5.4332D-04
-8.5972D-05	-2.5405D-04	5.1290D-04	-2.7844D-03	-3.3047D-04	-2.8802D-03
4.3849D-04	1.4265D-03	-2.4972D-03	1.2317D-03	-1.6733D-04	1.3700D-03
-1.2230D-03	-1.4431D-04	-2.0231D-03	2.0085D-03	-9.0903D-04	-7.1235D-04

Columns 13 thru 18

-2.2435D-08	2.3123D-08	7.1820D-08	4.0910D-08	-4.0695D-08	-7.2774D-08
-3.2384D-08	-3.1411D-08	-4.7769D-09	2.0032D-08	2.1191D-08	-4.5253D-09
-1.5615D-07	-1.5134D-07	-4.9452D-08	1.3091D-07	1.3865D-07	-4.6806D-08
-2.2435D-08	2.3123D-08	7.1820D-08	4.0910D-08	-4.0695D-08	-7.2774D-08
-3.2384D-08	-3.1411D-08	-4.7769D-09	2.0032D-08	2.1191D-08	-4.5253D-09
-1.5615D-07	-1.5134D-07	-4.9452D-08	1.3091D-07	1.3865D-07	-4.6806D-08
2.4887D-09	3.9982D-08	3.8667D-08	1.6408D-08	-3.1744D-08	-3.8156D-08
-4.5445D-08	-5.9567D-08	-3.9680D-09	3.5688D-08	6.4960D-08	2.4373D-08
1.3404D-07	-4.8408D-08	-1.5120D-07	-1.5510D-07	-5.0342D-08	1.3552D-07
2.4887D-09	3.9982D-08	3.8667D-08	1.6408D-08	-3.1744D-08	-3.8156D-08
-4.5445D-08	-5.9567D-08	-3.9680D-09	3.5688D-08	6.4960D-08	2.4373D-08
1.3404D-07	-4.8408D-08	-1.5120D-07	-1.5510D-07	-5.0342D-08	1.3552D-07
-3.9459D-08	-2.6544D-09	3.7483D-08	3.2773D-08	-1.6175D-08	-3.9571D-08
-6.0114D-08	-4.5175D-08	2.4245D-08	6.4653D-08	3.6312D-08	-3.9079D-09
-4.5613D-08	1.3187D-07	1.3349D-07	-4.3119D-08	-1.5539D-07	-1.5645D-07
-3.9459D-08	-2.6544D-09	3.7483D-08	3.2773D-08	-1.6175D-08	-3.9571D-08
-6.0114D-08	-4.5175D-08	2.4245D-08	6.4653D-08	3.6312D-08	-3.9079D-09
-4.5613D-08	1.3187D-07	1.3349D-07	-4.3119D-08	-1.5539D-07	-1.5645D-07
6.5328D-08	-1.4151D-08	-1.8023D-07	-9.6829D-08	5.9637D-08	9.3060D-08
7.3845D-08	7.5161D-08	-1.0262D-08	-1.4888D-07	-5.1852D-08	1.7915D-08
-9.7619D-08	-1.0110D-07	2.0828D-08	1.8148D-07	6.3563D-08	-1.1849D-08
7.1525D-08	-1.1433D-08	-2.2492D-07	-1.2858D-07	8.4312D-08	1.1611D-07
3.1308D-08	-3.0425D-08	-1.2410D-07	-1.1020D-07	1.1102D-07	1.2104D-07
4.4935D-08	4.4908D-08	2.1285D-08	-5.1128D-08	-5.0925D-08	2.0454D-08
-7.5259D-08	-7.4863D-08	-8.2663D-09	7.7552D-08	7.7081D-08	-7.4084D-09
2.7552D-08	-2.7855D-08	-1.4280D-07	-1.4813D-07	1.4843D-07	1.4012D-07
1.8644D-08	-6.5643D-08	-9.6373D-08	-5.4330D-08	9.4975D-08	1.7697D-07
7.4783D-08	7.1834D-08	2.2250D-08	-5.2633D-08	-1.5089D-07	-6.9750D-09
-1.0126D-07	-9.3664D-08	-1.7199D-08	6.3668D-08	1.8499D-07	1.6546D-08
1.6352D-08	-7.2798D-08	-1.1934D-07	-7.8084D-08	1.2582D-07	2.2180D-07
-1.0520D-08	-7.9532D-08	-5.4604D-08	-2.2535D-08	4.2567D-08	9.9271D-08
1.2079D-07	9.6524D-08	3.8108D-09	-4.9901D-08	-1.1655D-07	-7.0729D-08
-1.6677D-07	-1.1861D-07	1.4525D-08	6.1982D-08	1.2673D-07	9.0126D-08
-6.6799D-09	-7.7272D-08	-7.9046D-08	-5.0152D-08	6.3400D-08	1.4092D-07
8.0729D-08	-8.2393D-08	-7.2611D-08	-3.1498D-08	2.9801D-08	7.4654D-08
1.5661D-07	1.6128D-07	-2.4758D-08	-9.4182D-08	-9.0138D-08	-2.3925D-08

-2.0024D-07	-2.0521D-07	4.0187D-08	1.1143D-07	1.0718D-07	3.9163D-08
9.3251D-08	-9.5813D-08	-9.3134D-08	-4.8588D-08	4.6043D-08	9.7149D-08
8.0275D-08	1.1792D-08	-1.0055D-07	-4.3194D-08	2.4366D-08	5.3532D-08
9.5467D-08	1.2255D-07	-7.1389D-08	-1.1671D-07	-4.7729D-08	3.6686D-09
-1.1853D-07	-1.6803D-07	9.0329D-08	1.2605D-07	6.0401D-08	1.3655D-08
7.8610D-08	7.4952D-09	-1.4175D-07	-6.3652D-08	5.2002D-08	7.8156D-08
4.0407D-08	-4.3102D-08	-1.0321D-07	-6.5082D-08	6.2828D-08	1.0824D-07
1.0086D-07	9.3103D-08	-9.0984D-09	-8.6238D-08	-8.5847D-08	-1.3268D-08
-1.3656D-07	-1.2978D-07	2.3238D-08	9.9009D-08	1.1541D-07	3.2697D-08
3.7755D-08	-4.9673D-08	-1.2948D-07	-9.1806D-08	9.5675D-08	1.4622D-07
3.4384D-09	-3.5670D-09	3.3222D-09	-3.5971D-09	3.4611D-09	-3.4954D-09
-1.0260D-07	1.0673D-07	2.8728D-07	1.7276D-07	-1.7191D-07	-2.9190D-07
-2.7579D-07	-2.5470D-07	3.1402D-08	2.3296D-07	2.2343D-07	4.3097D-08
-2.5754D-07	-2.5149D-07	-1.7322D-08	2.6959D-07	2.7654D-07	-1.8411D-08
1.6521D-07	-1.6758D-07	-3.0275D-07	-1.4079D-07	1.3802D-07	3.0714D-07
-1.2291D-07	1.2950D-07	2.6838D-07	1.9351D-07	-1.9507D-07	-2.7426D-07
-2.3719D-07	-2.9249D-07	5.9653D-08	1.9293D-07	2.6190D-07	1.6898D-08
-1.2436D-07	1.2286D-07	2.6566D-07	1.9286D-07	-1.8882D-07	-2.6841D-07
-3.0092D-07	-2.3808D-07	1.0982D-08	2.5693D-07	2.0495D-07	6.5484D-08
-7.8448D-08	7.3807D-08	3.1645D-07	1.4952D-07	-1.3988D-07	-3.1987D-07
-2.6653D-07	-2.6034D-07	3.8857D-08	2.2462D-07	2.2918D-07	3.5282D-08
-2.5099D-08	3.0910D-07	1.8963D-07	6.0491D-09	-1.7391D-07	-3.1925D-07
-2.3871D-08	-4.7536D-08	-2.4577D-07	4.8516D-08	2.7943D-07	9.8407D-09
-2.7855D-07	3.8805D-07	5.7471D-07	2.3877D-07	-3.4435D-07	-6.5736D-07
-4.5493D-07	-4.5441D-07	-1.1680D-07	4.8343D-07	5.7863D-07	1.5929D-08
-1.6720D-07	1.5026D-07	4.2721D-08	-1.2413D-07	1.2023D-07	-3.3552D-08
-2.8562D-07	-3.1926D-07	2.2661D-08	2.9996D-07	2.4943D-07	9.4928D-09
-3.3772D-07	3.1293D-07	5.3662D-07	1.9170D-07	-1.7946D-07	-5.2771D-07
-5.8225D-07	-6.0898D-07	1.3008D-08	5.7188D-07	5.2439D-07	-1.1537D-08
-3.0977D-07	7.2270D-09	3.6290D-07	1.7034D-07	-3.9244D-08	-1.6530D-07
-2.7256D-08	-4.8280D-08	1.6951D-08	2.8460D-07	1.4137D-08	-2.3769D-07
-3.8992D-07	2.7305D-07	7.0146D-07	3.4707D-07	-2.8090D-07	-5.6565D-07
-4.2527D-07	-4.6518D-07	1.3742D-08	5.6994D-07	4.5182D-07	-9.9154D-08
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3.0062D-07	5.3074D-07	4.6397D-08	-2.0987D-07	-3.2514D-07	-2.1285D-07
-2.1041D-07	4.6390D-08	5.2987D-07	3.0220D-07	-2.1451D-07	-3.2626D-07
-3.2945D-07	-2.0983D-07	3.0223D-07	5.2682D-07	4.9816D-08	-2.0813D-07
-2.1110D-07	-3.2517D-07	-2.1455D-07	4.9850D-08	5.3080D-07	2.9770D-07
5.0682D-08	-2.1289D-07	-3.2630D-07	-2.0809D-07	2.9771D-07	5.2901D-07
-9.8611D-08	3.3453D-08	6.2060D-08	-8.7337D-08	3.5482D-08	6.0673D-08
-5.8972D-09	1.4766D-09	1.4049D-09	-6.9249D-09	5.3535D-10	2.3885D-09
-1.1804D-07	6.2525D-08	9.1838D-08	-1.1907D-07	7.0202D-08	1.0230D-07
-9.8611D-08	3.3453D-08	6.2060D-08	-8.7337D-08	3.5482D-08	6.0673D-08
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-1.1804D-07	6.2525D-08	9.1838D-08	-1.1907D-07	7.0202D-08	1.0230D-07
-4.8113D-08	2.2316D-08	3.0503D-08	-5.2168D-08	2.3270D-08	3.0680D-08
9.4539D-08	-3.6719D-08	-5.6815D-08	9.5857D-08	-3.8310D-08	-5.6802D-08
-9.4963D-08	3.8999D-08	8.3991D-08	-8.2818D-08	5.4960D-08	8.7059D-08
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1.1672D-08	-8.5158D-09	-6.9544D-09	1.6187D-08	-7.4336D-09	-1.0226D-08
2.3808D-09	-1.0150D-08	5.2874D-09	8.3775D-09	-3.7134D-09	-3.8122D-09
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1.5445D-08	4.3388D-08	3.9085D-08	-9.2996D-10	4.8541D-08	4.1464D-08
-1.2915D-07	7.3016D-08	9.5740D-08	-1.2488D-07	8.5285D-08	1.1409D-07
2.2182D-07	-1.1477D-07	-1.4628D-07	2.0930D-07	-1.2605D-07	-1.7904D-07
6.1429D-08	3.4985D-08	2.1526D-08	3.5441D-08	4.2393D-08	2.0920D-08
-1.5076D-07	6.1701D-08	6.4097D-08	-1.3209D-07	5.8069D-08	1.0078D-07
6.8539D-08	-7.9795D-09	-1.1163D-08	7.2521D-08	-6.1664D-09	-1.4822D-08
-7.9218D-08	-6.5435D-09	-1.7110D-09	-8.2132D-08	-7.4702D-09	1.7751D-09
-1.5209D-07	6.0050D-08	6.6729D-08	-1.3891D-07	6.2824D-08	1.0081D-07
-2.2996D-07	3.7854D-08	8.1658D-08	-2.1936D-07	6.0930D-08	1.0006D-07
1.2574D-07	-2.6321D-08	-3.3609D-08	1.2027D-07	-2.9460D-08	-5.3221D-08
-1.4494D-07	2.9163D-08	3.2004D-08	-1.3066D-07	2.7243D-08	6.1775D-08
-2.6646D-07	4.1603D-08	9.6970D-08	-2.5977D-07	7.5719D-08	1.1638D-07
-1.2596D-07	1.2919D-08	6.1099D-08	-1.2288D-07	3.6602D-08	5.5177D-08
9.7537D-08	-3.8295D-08	-8.2033D-08	1.1015D-07	-7.1974D-08	-7.9067D-08
-9.9438D-08	4.5161D-08	9.0938D-08	-1.0706D-07	7.7723D-08	9.2571D-08
-1.3778D-07	3.3921D-09	4.7879D-08	-1.3227D-07	2.4858D-08	4.6101D-08
1.0390D-07	-3.8125D-08	-6.2481D-08	1.0808D-07	-5.3794D-08	-6.8545D-08
8.2604D-08	-6.7498D-08	-1.1246D-07	7.4820D-08	-9.2031D-08	-1.1281D-07
-9.6011D-08	7.4852D-08	1.3205D-07	-8.4933D-08	1.0633D-07	1.3211D-07
1.8909D-07	-6.6151D-08	-1.2107D-07	1.9931D-07	-9.8826D-08	-1.2229D-07
-5.1555D-08	4.1279D-08	6.2784D-08	-6.3622D-08	5.1274D-08	5.3906D-08
6.0751D-08	-2.9061D-08	-4.3125D-08	3.6222D-08	-2.1298D-08	-5.4857D-08
-4.9994D-08	2.9904D-08	5.0796D-08	-2.9766D-08	2.8227D-08	5.7529D-08
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-1.8847D-07	6.7652D-08	1.1452D-07	-1.8766D-07	8.6755D-08	1.2203D-07
3.2270D-07	-1.2238D-07	-1.8859D-07	3.1419D-07	-1.4302D-07	-2.0866D-07
4.4041D-07	-1.6140D-07	-2.6463D-07	4.2328D-07	-1.9556D-07	-2.8490D-07
3.5843D-09	-3.6657D-09	3.8946D-09	-3.8973D-09	4.1599D-09	-3.4190D-09
-1.7835D-08	9.4145D-09	2.6912D-08	-3.2535D-08	2.0927D-08	6.6106D-09
3.2625D-09	-1.7654D-09	-2.0985D-08	3.0118D-08	-2.4742D-08	3.8040D-09
-1.7809D-07	6.2714D-08	1.0297D-07	-1.7955D-07	7.4799D-08	1.1508D-07
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-5.1760D-08	4.5496D-08	-1.2859D-08	2.5347D-09	-1.5564D-08	3.9957D-08
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-6.7843D-07	-3.4821D-08	2.1873D-07	-5.5523D-07	1.3213D-07	3.5827D-07
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-4.8022D-08	-1.9048D-07	-8.2796D-08	9.4462D-09	-6.3864D-08	-8.8209D-09
-6.9558D-08	5.0000D-08	1.1392D-07	4.5158D-08	-6.1368D-09	5.4768D-08
-1.4480D-07	-7.6254D-09	1.9780D-07	-1.4510D-07	2.7845D-08	3.0553D-08
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-1.6508D-07	-2.4744D-09	4.1730D-08	-1.1757D-07	-4.4834D-09	5.0656D-08
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-1.8981D-07	2.7209D-08	2.4195D-08	-1.7428D-07	3.4118D-08	7.5780D-08
-2.0227D-07	6.8862D-09	7.0086D-08	-2.0396D-07	5.8846D-08	7.9320D-08
-3.1445D-05	8.1867D-06	-2.7665D-04	1.0595D-03	-1.0726D-03	3.4109D-04
-1.4324D-04	-1.8285D-04	6.3363D-04	1.8960D-04	1.3437D-04	6.2557D-04
4.4371D-05	-1.7031D-04	6.0895D-04	9.2008D-04	6.5551D-04	5.6736D-04
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-5.6651D-05	-1.0236D-03	8.6430D-04	-5.8814D-04	7.7379D-05	8.0370D-05
4.2872D-04	8.6396D-04	8.6816D-04	4.0917D-04	1.0216D-05	4.9648D-05
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-5.1813D-05	1.0641D-04	2.2146D-03	-2.3891D-04	8.3857D-05	6.1495D-05
-7.2067D-05	9.7748D-05	-1.4412D-03	2.5471D-03	1.2786D-04	5.4921D-05
3.1497D-04	-1.5354D-04	1.3096D-03	-3.5453D-03	1.1189D-04	8.4819D-05
-3.2226D-04	-1.9166D-04	3.4858D-03	5.2506D-04	-5.2124D-05	-2.5104D-04
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-4.1570D-04	-4.0464D-04	-2.8412D-04	2.5159D-04	2.2783D-04	-2.6062D-04
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-1.5836D-04	1.3344D-04	3.0645D-04	1.0624D-04	-3.6991D-03	1.4949D-03
-2.9458D-05	3.8978D-04	3.8900D-04	-2.0066D-04	-4.0353D-04	-3.3541D-03
1.6567D-04	1.3591D-04	2.8433D-04	3.9582D-04	3.7940D-04	-6.0534D-04
-7.7760D-04	3.0314D-04	3.6963D-04	8.2306D-05	-7.9686D-05	5.8259D-04
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2.1483D-03	2.3594D-03	-5.2662D-05	-4.7255D-04	-2.8009D-04	-2.5510D-05
-2.8091D-03	2.9329D-03	-2.4550D-04	8.4986D-05	8.8426D-06	5.8640D-05
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1.7138D-05	2.9766D-04	-1.2499D-04	-1.1452D-04	-7.9566D-05	9.2405D-06
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-1.8927D-04	-1.1190D-04	4.7972D-05	2.3642D-04	-2.7039D-04	-5.2062D-04
-1.0204D-04	1.0719D-04	-1.0380D-04	1.1423D-04	-1.0025D-04	1.1153D-04
3.8480D-04	-5.0276D-04	-1.1554D-03	-7.1825D-04	5.8873D-04	1.3846D-03
1.2840D-03	8.6566D-04	6.7529D-05	-9.8621D-04	-1.0538D-03	-1.5128D-04
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4.1418D-04	-3.0355D-04	-2.7260D-04	3.1263D-04	-1.8186D-04	2.9177D-05
6.6186D-04	-7.5450D-04	-8.4785D-04	-9.9082D-04	9.1476D-04	1.1268D-03
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1.6070D-03	6.2744D-04	3.3081D-04	-1.2473D-03	-7.2711D-04	-4.5270D-04
-2.2433D-05	-1.2471D-04	-1.5580D-03	-3.8568D-04	2.1263D-04	1.7415D-03
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1.5939D-03	-1.6056D-03	6.4855D-04	3.6782D-03	-2.1582D-04	1.6104D-03
-3.5064D-03	-1.7224D-03	2.2712D-03	2.2051D-05	-2.2349D-03	1.5931D-03
1.1071D-04	3.3094D-04	-2.1656D-04	1.1975D-03	3.7868D-04	2.1760D-03
-1.4163D-03	3.5781D-04	-4.8524D-04	3.7483D-04	-2.4652D-03	1.0292D-03
2.5697D-03	-2.1732D-03	1.8242D-03	2.7377D-03	-2.3606D-03	-2.3125D-03
7.4334D-04	2.2374D-03	1.7343D-03	-8.8921D-04	1.0504D-03	1.9390D-03
2.3059D-03	-2.0443D-03	8.7687D-04	-8.6338D-05	4.3881D-04	-1.2227D-03
1.3471D-03	2.7631D-03	-3.3587D-04	-2.4960D-04	1.4236D-03	-1.4700D-04
1.7239D-03	-4.5532D-04	-3.2820D-03	5.0780D-04	-2.4943D-03	-2.0194D-03
-2.2703D-03	-2.3550D-03	1.0261D-03	-2.7846D-03	1.2318D-03	2.0082D-03
-3.3943D-04	8.7545D-04	-3.4314D-03	-3.3367D-04	-1.6560D-04	-9.0691D-04
7.2483D-06	-5.1458D-04	5.4339D-04	-2.8810D-03	1.3704D-03	-7.1177D-04
-6.7427D-03	-1.0872D-03	4.9768D-04	4.6848D-04	5.3540D-04	2.8793D-04
-1.0872D-03	-6.9822D-03	4.8351D-04	4.9790D-04	2.7534D-04	6.2602D-04
4.9763D-04	4.8347D-04	-6.9026D-03	-1.1341D-03	6.8802D-04	3.3904D-04
4.6841D-04	4.9790D-04	-1.1341D-03	-6.8028D-03	3.4756D-04	4.2680D-04
5.3539D-04	2.7534D-04	6.8807D-04	3.4752D-04	-6.9399D-03	-9.4676D-04
2.8791D-04	6.2592D-04	3.3908D-04	4.2679D-04	-9.4686D-04	-6.9168D-03

D_{sn} =

Columns 1 thru 6

-8.7376D-08	-1.2283D-07	2.8270D-08	-1.4863D-08	-2.8972D-10	1.5513D-08
7.0808D-10	2.5400D-08	2.6801D-10	3.2114D-09	4.5375D-08	4.1753D-09
3.6396D-09	1.4131D-07	-5.3262D-08	-3.9497D-08	3.2646D-07	-3.4037D-08
-8.7376D-08	-1.2283D-07	2.8270D-08	-1.4863D-08	-2.8972D-10	1.5513D-08
7.0808D-10	2.5400D-08	2.6801D-10	3.2114D-09	4.5375D-08	4.1753D-09
3.6396D-09	1.4131D-07	-5.3262D-08	-3.9497D-08	3.2646D-07	-3.4037D-08
1.0305D-07	4.8677D-08	1.3590D-08	-3.8804D-08	-1.0690D-08	3.7181D-09
-1.3208D-07	-5.8022D-08	-2.4353D-08	-2.3834D-08	1.2203D-08	-1.4389D-08
-1.2836D-07	-7.3057D-08	-5.1870D-08	3.2673D-07	-3.9494D-08	-3.4882D-08
1.0305D-07	4.8677D-08	1.3590D-08	-3.8804D-08	-1.0690D-08	3.7181D-09
-1.3208D-07	-5.8022D-08	-2.4353D-08	-2.3834D-08	1.2203D-08	-1.4389D-08

-1.2836D-07	-7.3057D-08	-5.1870D-08	3.2673D-07	-3.9494D-08	-3.4882D-08
1.0267D-07	7.1690D-08	3.7375D-08	-4.5291D-09	1.1388D-08	3.8732D-08
1.3519D-07	1.5102D-07	-2.1057D-08	-1.5787D-08	1.1401D-08	-2.2085D-08
1.1756D-07	-7.5038D-08	3.5455D-07	-3.4878D-08	-3.4039D-08	3.2144D-07
1.0267D-07	7.1690D-08	3.7375D-08	-4.5291D-09	1.1388D-08	3.8732D-08
1.3519D-07	1.5102D-07	-2.1057D-08	-1.5787D-08	1.1401D-08	-2.2085D-08
1.1756D-07	-7.5038D-08	3.5455D-07	-3.4878D-08	-3.4039D-08	3.2144D-07
-1.3839D-07	-5.3792D-08	-7.1000D-08	4.4131D-08	4.8071D-09	-5.5058D-08
6.7734D-08	4.6692D-09	3.8853D-08	2.6818D-08	-6.1830D-08	3.1382D-08
5.1260D-09	7.2104D-08	-3.7793D-08	-2.4877D-08	5.6043D-08	-2.9548D-08
-1.1382D-07	-1.8880D-08	-6.8926D-08	3.8704D-08	7.1396D-09	-4.9028D-08
-1.4321D-07	-4.2006D-08	-5.8386D-08	3.8544D-08	1.8289D-09	-3.9992D-08
-1.7305D-10	-4.6879D-08	1.7524D-08	1.0819D-08	-9.5125D-08	1.1767D-08
6.8387D-10	6.8340D-08	-1.7259D-08	-8.2165D-09	9.4981D-08	-8.9828D-09
-4.6414D-08	5.1429D-08	-4.9184D-08	2.5782D-08	1.3387D-09	-2.6929D-08
-1.4075D-07	-2.3420D-08	-6.7896D-08	5.5575D-08	-1.3516D-10	-4.9229D-08
-7.0641D-08	-1.4747D-07	3.9006D-08	3.4524D-08	-6.6396D-08	2.8299D-08
-4.3505D-10	1.0301D-07	-3.8706D-08	-3.4668D-08	6.1921D-08	-2.5211D-08
-1.1695D-07	1.2927D-08	-6.7798D-08	5.0248D-08	-2.4311D-09	-4.4884D-08
-3.2595D-08	4.2353D-08	-4.3694D-08	8.2713D-08	9.8207D-09	-2.9954D-08
-2.7263D-08	-1.1928D-07	4.2566D-08	4.6971D-08	-3.9535D-08	2.9065D-08
-6.2533D-08	5.2363D-08	-3.4901D-08	-4.7385D-08	2.6934D-08	-1.8511D-08
-1.0620D-07	-8.2315D-09	-3.9107D-08	8.2323D-08	5.6868D-09	-2.0917D-08
3.6479D-08	8.4577D-08	-6.8583D-08	5.6745D-08	-1.5818D-09	-5.5275D-08
1.3269D-09	-9.7324D-08	4.2375D-08	2.7798D-08	-5.2688D-08	3.1870D-08
-1.2955D-09	1.1459D-07	-4.0802D-08	-2.3230D-08	4.7131D-08	-2.7281D-08
-6.0764D-08	1.3004D-08	-6.6954D-08	5.3182D-08	-2.5470D-09	-5.0537D-08
-3.1978D-08	6.4416D-09	-9.3446D-08	2.9137D-08	-8.9545D-09	-8.3099D-08
2.6379D-08	-3.8883D-08	5.3677D-08	2.6660D-08	-3.8214D-08	4.7384D-08
6.4218D-08	1.3510D-07	-5.3727D-08	-1.7281D-08	2.6053D-08	-4.7327D-08
-1.0583D-07	-3.6440D-08	-9.4490D-08	2.0613D-08	-4.9522D-09	-8.2993D-08
-8.1793D-08	-8.3176D-10	-6.2940D-08	4.8046D-08	-2.2683D-09	-4.5984D-08
2.5213D-08	-5.8106D-08	3.5777D-08	3.1072D-08	-5.6806D-08	2.5542D-08
5.8087D-10	1.0182D-07	-3.1388D-08	-2.9165D-08	4.9137D-08	-1.8879D-08
-1.0025D-07	1.9881D-09	-5.6985D-08	4.2411D-08	-3.2436D-09	-3.6049D-08
4.9009D-08	4.2232D-08	8.5161D-11	3.7766D-11	9.2891D-12	-9.0452D-11
4.5469D-07	2.0989D-07	1.6474D-07	-1.2384D-07	9.2894D-10	1.2224D-07
-4.0722D-07	-1.5009D-07	-9.3610D-08	-7.6308D-08	1.4534D-07	-6.7147D-08
1.0047D-08	2.4704D-07	-2.0756D-07	-1.8404D-07	3.5888D-07	-1.7470D-07
-2.4760D-07	2.3864D-09	-3.6123D-07	3.0992D-07	-2.3122D-09	-3.0729D-07
-7.4695D-07	-8.2714D-07	1.6565D-07	-1.2563D-07	1.7873D-09	1.2643D-07
1.6539D-06	1.6289D-06	-9.5757D-08	-7.3066D-08	1.4130D-07	-7.5025D-08
-7.3912D-07	-8.1428D-07	1.6129D-07	-1.2190D-07	3.8993D-09	1.2301D-07
-1.6535D-06	-1.2199D-06	-9.8404D-08	-7.6177D-08	1.4960D-07	-6.7572D-08
2.1275D-06	1.6539D-06	1.6539D-07	-1.2836D-07	3.6412D-09	1.1756D-07
1.4203D-08	2.1123D-07	-9.1853D-08	-7.6428D-08	1.4500D-07	-6.6934D-08
-1.9052D-07	-4.1799D-07	5.7734D-08	-2.3523D-07	-4.2974D-08	1.4457D-08
-7.7660D-07	-4.8685D-07	-3.9760D-08	-8.6161D-08	2.4724D-07	-9.8079D-09
-7.2652D-07	-1.0848D-06	5.9260D-07	-5.2909D-07	-2.4923D-08	4.7094D-07
-2.1834D-06	-1.4050D-06	-3.5636D-07	-2.8327D-07	6.1246D-07	-2.7542D-07
8.5781D-07	6.7687D-07	2.1854D-07	-1.9396D-07	-9.3266D-09	2.0475D-07

-1.3739D-08	2.2537D-07	-1.9003D-07	-1.1990D-07	-1.9714D-08	-1.6393D-07
2.8783D-06	2.1199D-06	6.1291D-07	-5.1870D-07	-3.2606D-10	5.1538D-07
1.8290D-08	5.0032D-07	-3.7714D-07	-2.9254D-07	5.1541D-07	-3.2019D-07
-2.2191D-07	-3.0260D-07	2.6978D-07	1.8088D-08	5.0053D-09	2.3907D-07
7.4095D-07	6.8090D-07	-9.2707D-08	1.6063D-08	2.3786D-07	-1.0052D-07
-7.7731D-07	-1.0744D-06	6.4186D-07	-4.4791D-07	-1.0204D-08	5.4528D-07
2.1347D-06	2.2367D-06	-3.4460D-07	-2.4488D-07	5.8930D-07	-2.9759D-07
-7.8394D-08	-2.3717D-07	-3.1745D-08	1.3404D-07	-1.5616D-07	-4.5607D-08
7.3788D-08	-2.9252D-07	1.8771D-07	-4.8399D-08	-1.5133D-07	1.3186D-07
3.1647D-07	5.9672D-08	1.8914D-07	-1.5119D-07	-4.9438D-08	1.3347D-07
1.4952D-07	1.9289D-07	-3.1706D-08	-1.5511D-07	1.3091D-07	-4.3111D-08
-1.3987D-07	2.6194D-07	-2.2249D-07	-5.0345D-08	1.3864D-07	-1.5538D-07
-3.1992D-07	1.6893D-08	-2.2280D-07	1.3552D-07	-4.6808D-08	-1.5644D-07
8.5727D-08	-5.4367D-08	8.3075D-08	-3.6554D-08	-5.1612D-08	8.7252D-08
1.0233D-08	-8.2886D-09	2.1591D-08	-8.5732D-09	-8.7323D-09	2.2928D-08
1.4164D-07	-1.0802D-07	2.1055D-07	-1.1433D-07	-1.3161D-07	2.2427D-07
8.5727D-08	-5.4367D-08	8.3075D-08	-3.6554D-08	-5.1612D-08	8.7252D-08
1.0233D-08	-8.2886D-09	2.1591D-08	-8.5732D-09	-8.7323D-09	2.2928D-08
1.4164D-07	-1.0802D-07	2.1055D-07	-1.1433D-07	-1.3161D-07	2.2427D-07
3.6378D-08	-3.5490D-08	3.9906D-08	-2.4374D-08	-2.3309D-08	4.2569D-08
-7.8446D-08	6.8490D-08	-9.6465D-08	4.7732D-08	5.3294D-08	-1.0313D-07
1.0836D-07	-8.3026D-08	1.6368D-07	-8.3527D-08	-1.1242D-07	1.7496D-07
3.6378D-08	-3.5490D-08	3.9906D-08	-2.4374D-08	-2.3309D-08	4.2569D-08
-7.8446D-08	6.8490D-08	-9.6465D-08	4.7732D-08	5.3294D-08	-1.0313D-07
1.0836D-07	-8.3026D-08	1.6368D-07	-8.3527D-08	-1.1242D-07	1.7496D-07
-2.2394D-08	1.7728D-08	-3.8829D-08	2.3313D-08	2.1670D-08	-4.0006D-08
-6.2795D-09	-1.4414D-10	-3.0477D-09	5.9037D-09	-5.6177D-09	-2.5259D-09
-2.4846D-07	1.9835D-07	-4.0561D-07	1.7919D-07	2.2517D-07	-4.2435D-07
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-1.6166D-08	3.3480D-09	-2.9460D-08	-2.1301D-08	-6.6388D-09	-2.5597D-08
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-4.5774D-08	3.6173D-08	-6.7918D-08	1.8852D-08	1.6484D-08	-6.9999D-08
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-6.1882D-08	5.5889D-08	-7.5423D-08	2.5626D-08	2.5053D-08	-7.7325D-08
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7.4998D-08	-6.8546D-08	9.8283D-08	-2.8229D-08	-4.5392D-08	1.0324D-07
-6.5750D-08	7.1760D-08	-7.6377D-08	4.6449D-08	5.5664D-08	-8.3011D-08
9.1271D-08	-6.8427D-08	9.4942D-08	-6.0079D-08	-7.3550D-08	1.0312D-07
8.7761D-08	-6.3075D-08	1.1333D-07	-2.5366D-08	-4.3501D-08	1.1763D-07
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7.5279D-08	-6.2737D-08	3.9472D-08	-4.5775D-08	-6.8573D-08	4.9857D-08
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-5.3629D-08	3.0288D-08	-4.6491D-08	2.7784D-08	3.9903D-08	-4.9590D-08
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-1.9934D-07	1.5127D-07	-2.0269D-07	9.7576D-08	1.1975D-07	-2.1554D-07
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-3.1688D-07	2.4220D-07	-3.1731D-07	1.5643D-07	1.9044D-07	-3.3795D-07
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1.5792D-08	-5.2662D-09	4.8567D-08	-2.1907D-08	-2.8796D-08	4.9593D-08
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-4.9518D-08	-2.7718D-08	-5.7970D-08	2.7179D-08	3.6408D-08	-5.6325D-08
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-2.0002D-07	6.2523D-07	-1.0198D-06	4.7860D-07	4.6325D-07	-1.0764D-06
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-4.6115D-07	3.5454D-07	-8.1506D-07	4.5388D-07	6.6644D-07	-8.5829D-07
-3.8404D-07	-4.6056D-08	-2.1424D-07	1.2614D-07	9.1435D-08	-2.2952D-07
-1.1905D-07	9.2261D-08	-3.6208D-07	1.9821D-07	3.5750D-07	-3.7528D-07
6.4121D-07	-2.9526D-07	8.8694D-07	-5.7105D-07	-5.8267D-07	9.2770D-07
-3.4270D-07	-1.1455D-07	-8.9868D-08	-1.6321D-08	-2.7949D-08	-8.5290D-08
1.0510D-07	8.8513D-08	1.7253D-07	-1.9354D-07	-1.3046D-07	1.7603D-07
9.3560D-09	-3.1314D-07	3.1887D-07	-1.9963D-07	-2.4088D-07	3.3397D-07
-1.4555D-07	1.2253D-07	-1.2305D-07	8.0217D-08	1.1164D-07	-1.3882D-07
5.8704D-08	-4.3764D-08	7.5608D-08	-2.3286D-08	-2.3065D-09	7.5619D-08
6.9858D-08	-5.2368D-08	7.4708D-08	1.1844D-09	-2.5853D-08	7.3082D-08
-1.5893D-07	1.0992D-07	-1.2757D-07	9.7369D-08	9.5771D-08	-1.4069D-07
9.8412D-08	-7.2647D-08	1.3139D-07	-4.0592D-08	-4.2274D-08	1.3249D-07
1.0037D-07	-8.3625D-08	1.2635D-07	-3.0485D-08	-5.1091D-08	1.3025D-07
-4.0157D-04	6.1617D-05	-1.0017D-04	-1.1380D-04	1.0016D-05	1.1668D-04
-2.9812D-05	-2.1369D-04	-4.7719D-05	-1.3357D-04	-1.0023D-03	-1.7182D-04
-1.7467D-04	-2.0790D-04	1.4135D-04	3.4730D-04	-4.5336D-03	1.1286D-04
-4.0157D-04	6.1617D-05	-1.0017D-04	-1.1380D-04	1.0016D-05	1.1668D-04
-2.9812D-05	-2.1369D-04	-4.7719D-05	-1.3357D-04	-1.0023D-03	-1.7182D-04
-1.7467D-04	-2.0790D-04	1.4135D-04	3.4730D-04	-4.5336D-03	1.1286D-04
-2.9573D-04	5.1314D-05	7.3539D-06	8.5307D-04	6.9951D-05	2.0717D-04
1.3478D-05	-3.7638D-04	1.0191D-04	5.4781D-04	1.4050D-04	-2.1989D-05
2.9570D-04	1.9685D-04	1.4480D-04	-4.5478D-03	3.4728D-04	1.4970D-04
-2.9573D-04	5.1314D-05	7.3539D-06	8.5307D-04	6.9951D-05	2.0717D-04
1.3478D-05	-3.7638D-04	1.0191D-04	5.4781D-04	1.4050D-04	-2.1989D-05
2.9570D-04	1.9685D-04	1.4480D-04	-4.5478D-03	3.4728D-04	1.4970D-04
-2.6291D-04	-5.4965D-05	2.6434D-05	-1.8332D-04	-1.0094D-04	-8.5155D-04
-1.3712D-04	-3.4305D-04	-4.0765D-05	1.4380D-05	1.5622D-04	4.6730D-04

-5.0506D-05	7.8523D-05	-4.1729D-03	1.4964D-04	1.1283D-04	-4.3186D-03
-2.6291D-04	-5.4965D-05	2.6434D-05	-1.8332D-04	-1.0994D-04	-8.5155D-04
-1.3712D-04	-3.4305D-04	-4.0765D-05	1.4380D-05	1.5622D-04	4.6730D-04
-5.0506D-05	7.8523D-05	-4.1729D-03	1.4964D-04	1.1283D-04	-4.3186D-03
6.3905D-04	2.3347D-04	1.1354D-04	-1.7274D-04	2.1862D-04	2.5410D-04
-1.8148D-04	-1.5723D-04	1.4970D-04	-1.5623D-04	-4.8243D-06	3.2443D-04
-1.6174D-04	-1.6019D-04	-4.3449D-04	6.1796D-05	3.0684D-04	-5.1056D-04
4.8495D-04	8.6903D-05	-8.9946D-05	7.9735D-05	2.1712D-04	-1.2017D-05
4.1987D-04	-9.1238D-05	1.6468D-04	-1.9793D-04	-6.8124D-05	2.5353D-04
-2.9174D-06	2.3213D-04	7.5363D-05	-3.8009D-05	3.2252D-05	-7.7986D-05
-6.9627D-06	-4.8124D-04	-1.8286D-04	-6.1838D-05	2.4335D-04	-2.4723D-05
-3.1902D-04	-5.8028D-04	-8.5993D-05	1.7202D-04	-3.4745D-05	-1.4516D-04
7.6046D-04	-4.4307D-05	2.7112D-04	-3.0047D-04	-3.9362D-04	3.9660D-04
2.1378D-04	6.9391D-04	-1.3652D-04	2.1247D-04	1.8050D-04	-2.1647D-04
8.3744D-05	-5.2789D-04	5.1124D-05	-3.1913D-04	6.5981D-05	8.2176D-05
6.4345D-04	-1.8006D-04	1.3507D-04	-7.7736D-05	-3.8154D-04	1.8479D-04
3.0296D-04	-8.6096D-05	5.3148D-06	-4.6831D-05	-6.1664D-05	1.8645D-04
-1.2258D-04	3.6118D-04	-2.0279D-04	1.8152D-05	2.0862D-04	-1.9541D-04
5.4833D-04	1.1301D-04	5.6771D-05	-1.4547D-04	1.7808D-04	-1.0040D-04
8.0205D-04	3.3825D-04	-2.0816D-04	1.9249D-04	4.3799D-05	-1.0045D-04
-2.9362D-04	-3.1016D-04	-7.8976D-05	7.5412D-05	6.7813D-05	-1.4961D-04
-9.8068D-05	5.0823D-04	-2.0340D-04	-2.0175D-04	2.7216D-04	-4.1030D-04
1.1944D-04	-5.6571D-04	1.6349D-04	5.4440D-05	-8.1851D-06	2.7536D-04
1.1839D-04	6.4336D-05	-4.1911D-04	3.1553D-04	1.1172D-04	-4.4414D-04
2.9560D-04	4.8907D-05	2.8610D-04	-1.4500D-04	2.6806D-05	5.1097D-05
7.4494D-05	3.2661D-04	-1.6426D-04	-8.5076D-05	1.6176D-04	-2.5328D-05
-4.8310D-04	-8.5744D-04	-1.9030D-04	-1.7358D-04	1.9915D-04	-1.0587D-04
7.8046D-04	2.1797D-04	-3.1370D-04	1.2206D-04	-6.5959D-05	-1.8751D-04
2.0460D-04	1.0407D-04	-1.3901D-04	-2.3963D-05	1.0947D-04	-8.3033D-05
-1.0309D-05	1.7263D-04	1.0241D-04	-1.4582D-04	7.3361D-05	7.2074D-05
-1.4145D-04	-3.2111D-04	-3.8797D-04	6.2001D-06	2.0792D-04	-1.9318D-04
2.0662D-04	1.4901D-04	-5.1229D-04	2.3174D-04	1.0960D-04	-3.3370D-04
-2.0460D-04	-1.7516D-04	-1.5122D-06	-1.3226D-06	-6.7962D-08	4.9815D-08
-1.7528D-03	-6.6527D-04	-1.0436D-04	1.8482D-04	-1.0806D-04	-6.9405D-05
9.3117D-04	-1.2561D-04	5.4620D-05	2.5842D-04	-2.6574D-04	-9.6907D-06
-2.6621D-04	-3.4583D-04	2.0428D-03	2.1526D-03	-4.0023D-03	1.8379D-03
2.3772D-04	3.5728D-05	3.5930D-03	-3.4303D-03	1.3628D-04	3.2889D-03
1.5636D-03	2.1755D-03	-1.4508D-04	2.1047D-04	-1.1673D-04	-1.2147D-04
-4.6010D-03	-4.8915D-03	9.0869D-05	1.9707D-04	-2.0764D-04	7.8074D-05
1.5275D-03	2.0940D-03	-9.2739D-05	1.5298D-04	-1.4318D-04	-5.6524D-05
4.3516D-03	2.7826D-03	1.0362D-04	2.5525D-04	-3.3474D-04	2.2270D-05
-6.2975D-03	-4.6010D-03	-1.5524D-04	2.9544D-04	-1.7502D-04	-4.9966D-05
-2.3887D-04	-1.1059D-03	3.9284D-05	2.6471D-04	-2.5906D-04	-1.7154D-05
6.6011D-04	1.9585D-03	4.3776D-03	-1.1968D-04	-6.5477D-04	3.3922D-03
3.0591D-03	1.9772D-03	-2.4541D-03	5.2207D-04	6.1894D-05	-2.0374D-03
1.7873D-03	1.7376D-03	-5.2416D-03	2.6517D-03	6.0495D-04	-3.2546D-03
3.4903D-03	2.7810D-03	2.9707D-03	9.2625D-04	-2.7444D-03	1.9886D-03
-2.7903D-03	-1.9039D-03	-6.0674D-04	3.5790D-04	5.7146D-04	-9.7373D-04
1.4096D-03	1.2478D-04	-1.2121D-04	-2.3618D-03	5.5849D-03	-2.0137D-04
-2.4697D-03	-2.8619D-03	-2.7877D-03	2.1969D-03	1.9203D-04	-2.5549D-03
9.4145D-04	8.0897D-04	1.5462D-03	3.8358D-04	-2.4952D-03	1.9991D-03

1.4374D-03	1.7967D-03	3.1319D-04	-4.9574D-03	2.1565D-03	2.5436D-04
-2.2482D-03	-1.9462D-03	5.2071D-04	-2.8690D-03	2.1287D-04	1.1350D-03
2.4688D-03	2.1669D-03	-2.6904D-03	2.1086D-03	7.8744D-04	-2.7241D-03
-2.2184D-03	-1.3567D-03	1.7864D-03	9.2630D-04	-2.3462D-03	1.3108D-03
-2.2979D-05	8.1050D-04	3.8211D-05	8.3400D-04	4.5196D-05	4.2742D-04
-1.2471D-04	1.3430D-03	5.9109D-04	6.2442D-04	-1.7028D-04	8.6396D-04
-1.5579D-03	-4.4829D-04	5.7543D-04	-1.7089D-04	6.0874D-04	8.6847D-04
-3.8614D-04	-5.3007D-04	3.1528D-05	-5.0440D-06	9.2084D-04	4.0792D-04
2.1292D-04	-1.5164D-03	4.2410D-04	6.4052D-04	6.5510D-04	1.0985D-05
1.7418D-03	2.3822D-04	4.5924D-04	7.0141D-04	5.6676D-04	5.0680D-05

6-State Internally Balanced Reduced Order Model

F, =

Columns 1 thru 6

-3.3570D-01	1.6784D+02	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
-1.6784D+02	-3.3570D-01	0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-3.6050D-01	1.8021D+02	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	-1.8021D+02	-3.6050D-01	0.0000D+00	0.0000D+00
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-3.6054D-01	1.8023D+02
0.0000D+00	0.0000D+00	0.0000D+00	0.0000D+00	-1.8023D+02	-3.6054D-01

B, =

Columns 1 thru 6

2.4171D-02	3.6176D-02	1.7317D-02	2.3536D-02	-4.3452D-02	2.6011D-03
-4.2100D-01	-6.3685D-01	-3.0094D-01	-4.0835D-01	7.6132D-01	-4.5512D-02
-8.1624D-05	5.0667D-02	-2.8215D-03	3.8338D-02	8.4916D-02	-6.8600D-03
1.3880D-02	-6.2487D-01	6.1852D-02	-4.8072D-01	-1.0312D+00	8.8513D-02
5.5526D-02	5.0952D-02	4.3285D-02	3.5031D-02	-1.5474D-03	-3.3228D-02
-6.9272D-01	-6.1820D-01	-5.4780D-01	-4.1516D-01	2.1441D-02	4.2678D-01

Columns 7 thru 12

-2.9021D-02	2.9642D-03	1.9071D-02	-3.9080D-02	1.1675D-02	-2.6831D-02
5.0216D-01	-5.5000D-02	-3.4192D-01	6.8156D-01	-2.0516D-01	4.6302D-01
6.1435D-02	-6.5319D-03	-7.8949D-03	-5.1914D-02	-9.8787D-03	-3.9915D-02
-7.4075D-01	8.3519D-02	1.1176D-01	6.3721D-01	1.5042D-01	4.9764D-01
-1.1387D-03	-2.8572D-02	-4.5903D-02	5.8385D-02	-3.4044D-02	4.1890D-02
1.6733D-02	3.8809D-01	5.6984D-01	-7.1549D-01	4.3013D-01	-5.0327D-01

Columns 13 thru 18

-3.4547D-03	3.6610D-03	-3.5189D-03	3.6221D-03	-3.4541D-03	3.5963D-03
6.1591D-02	-6.2093D-02	6.1727D-02	-6.2480D-02	6.1763D-02	-6.2409D-02
3.4265D-03	-3.6498D-03	3.9550D-03	7.4748D-03	-7.2433D-03	-3.7184D-03
-4.5832D-02	5.0398D-02	-5.6748D-02	-1.0493D-01	1.0168D-01	5.3879D-02
-6.3640D-03	-6.3871D-03	6.0759D-03	3.4756D-05	3.0003D-04	6.3492D-03
9.1435D-02	9.1662D-02	-8.5141D-02	-1.9820D-03	-6.3662D-03	-8.9616D-02

G_s =

Columns 1 thru 6

1.1452D-02	9.7520D-03	6.0482D-05	-1.3961D-04	-7.9197D-05	-1.1024D-04
-2.3922D-01	-2.0400D-01	-2.6804D-03	3.0200D-04	6.0624D-04	6.9821D-04
-4.3715D-03	1.1696D-03	-2.9718D-03	2.2874D-03	9.0838D-04	-3.2298D-03
5.0908D-02	-1.4953D-02	4.5406D-02	-3.7166D-02	-1.1585D-02	4.9001D-02
-7.5351D-04	-3.8529D-03	6.4322D-04	2.3485D-03	-3.1435D-03	7.7785D-04
9.7692D-03	4.5246D-02	-1.2683D-02	-3.4909D-02	4.9922D-02	-1.4696D-02

C_s =

Columns 1 thru 6

-1.3948D-06	1.9283D-07	-1.0939D-05	-8.9082D-07	3.1022D-07	4.0246D-08
-1.5912D-07	-1.1058D-08	-1.0091D-07	-1.2402D-08	2.3197D-06	2.0186D-07
8.3959D-08	-2.3886D-09	-1.4057D-06	-1.3960D-07	6.0253D-06	8.6660D-07
-1.3948D-06	1.9283D-07	-1.0939D-05	-8.9082D-07	3.1022D-07	4.0246D-08
-1.5912D-07	-1.1058D-08	-1.0091D-07	-1.2402D-08	2.3197D-06	2.0186D-07
8.3959D-08	-2.3886D-09	-1.4057D-06	-1.3960D-07	6.0253D-06	8.6660D-07
8.3469D-07	-7.5805D-08	-9.0966D-07	-6.2279D-08	5.8844D-06	4.8390D-07
-1.1273D-06	1.6988D-07	5.4855D-06	4.5023D-07	-7.7135D-06	-6.1803D-07
4.7445D-08	-4.4653D-08	-4.4832D-06	-6.8292D-07	-4.2203D-06	-5.5214D-07
8.3469D-07	-7.5805D-08	-9.0966D-07	-6.2279D-08	5.8844D-06	4.8390D-07
-1.1273D-06	1.6988D-07	5.4855D-06	4.5023D-07	-7.7135D-06	-6.1803D-07
4.7445D-08	-4.4653D-08	-4.4832D-06	-6.8292D-07	-4.2203D-06	-5.5214D-07
5.5540D-07	-9.6402D-08	-1.0905D-06	-8.4910D-08	-5.5873D-06	-4.5490D-07
1.2732D-06	-1.4390D-07	-5.9932D-06	-5.0735D-07	-7.5386D-06	-6.0725D-07
9.7791D-08	1.0776D-10	5.9232D-06	8.1590D-07	-1.7672D-06	-3.0778D-07
5.5540D-07	-9.6402D-08	-1.0905D-06	-8.4910D-08	-5.5873D-06	-4.5490D-07
1.2732D-06	-1.4390D-07	-5.9932D-06	-5.0735D-07	-7.5386D-06	-6.0725D-07
9.7791D-08	1.0776D-10	5.9232D-06	8.1590D-07	-1.7672D-06	-3.0778D-07
-3.6265D-06	-1.2997D-07	6.3375D-06	5.1575D-07	5.9054D-06	5.3528D-07
6.6850D-06	1.9790D-07	6.0313D-06	5.7470D-07	-8.3053D-07	-1.6577D-07
-5.1667D-06	-2.3199D-07	-7.0413D-06	-6.7741D-07	5.2559D-07	1.0027D-07
-2.7436D-06	-1.5564D-07	7.8547D-06	6.9543D-07	6.7925D-06	6.1905D-07
5.2225D-06	3.5310D-07	1.0357D-06	1.8889D-07	2.9033D-08	-9.6818D-09
4.2220D-07	2.8822D-08	8.8801D-09	9.0680D-09	-5.6231D-06	-6.0777D-07
-6.1155D-07	-3.7812D-08	4.0552D-08	-8.1376D-09	6.5648D-06	6.3557D-07
1.3313D-05	6.0420D-07	-1.0240D-06	1.1676D-07	8.4775D-09	-1.5080D-08
-3.9659D-06	-1.4021D-07	6.0898D-06	4.8908D-07	-6.1154D-06	-5.8171D-07
-6.4899D-06	-2.0310D-07	-5.9949D-06	-5.4945D-07	-6.3696D-07	-1.3927D-07
4.9634D-06	2.4179D-07	6.9328D-06	6.4141D-07	2.4891D-07	7.1725D-08
-3.0850D-06	-1.6366D-07	7.5158D-06	6.6110D-07	-7.1718D-06	-6.8661D-07
-2.9729D-06	-2.1934D-07	-3.9488D-06	-4.1605D-07	-2.8534D-06	-3.5155D-07
4.2791D-06	2.9583D-07	-2.9095D-06	-3.3623D-07	-6.3771D-07	-9.2142D-09
-1.1190D-05	-5.0633D-07	2.4388D-06	3.2111D-07	2.3859D-06	6.7642D-08
-7.1836D-06	-3.6066D-07	-5.2037D-06	-4.5608D-07	-2.3171D-06	-3.3033D-07
7.5891D-06	2.2698D-07	-4.2223D-06	-4.8023D-07	5.3197D-08	-1.0461D-08
-1.8583D-07	-2.7484D-08	1.4270D-07	2.5367D-08	9.6955D-06	8.1751D-07
1.8735D-07	3.0288D-08	-2.4659D-07	-3.6355D-08	-1.1727D-05	-1.0477D-06
5.8280D-06	2.6726D-07	-4.4369D-06	-4.6595D-07	4.8895D-08	-9.6009D-09

-2.2528D-06	-1.7250D-07	-3.9519D-06	-4.0622D-07	2.8701D-06	3.3025D-07
-4.7032D-06	-3.5441D-07	2.8516D-06	3.5048D-07	-6.1438D-07	-1.6079D-08
1.1805D-05	5.8332D-07	-2.3559D-06	-3.3523D-07	2.4242D-06	7.1256D-08
-6.1359D-06	-2.9240D-07	-5.1263D-06	-4.3947D-07	2.4264D-06	3.1645D-07
-8.3026D-09	-1.4561D-08	5.4143D-06	3.7442D-07	-7.6788D-08	-2.0255D-08
1.6243D-06	2.7405D-08	5.0918D-08	1.8082D-08	5.4041D-06	3.6576D-07
1.9135D-08	1.3565D-08	1.8532D-06	1.3779D-07	-6.8220D-06	-5.4565D-07
-1.1813D-07	-2.3992D-08	7.3692D-06	5.8947D-07	-1.5889D-06	-1.5052D-07
2.7510D-06	6.4054D-08	-5.3628D-09	-1.6452D-09	5.8799D-09	-1.1895D-09
-4.3272D-06	-6.5080D-07	4.7447D-06	3.9764D-07	7.9136D-07	8.6788D-08
7.1931D-06	1.1739D-06	-8.4596D-07	-8.7307D-08	4.7796D-06	4.2220D-07
-8.1951D-07	-2.0170D-08	-1.3556D-06	-1.4887D-07	6.3315D-06	1.0348D-06
-7.0761D-07	-7.8900D-08	-6.3687D-06	-1.0362D-06	-1.5451D-06	-1.7115D-07
1.6975D-05	2.7012D-06	4.9541D-06	4.4958D-07	2.8104D-08	7.0187D-08
-2.8126D-05	-4.5145D-06	-1.8134D-06	-2.1813D-07	5.5049D-06	4.0766D-07
1.5747D-05	2.6115D-06	4.5682D-06	4.1933D-07	1.6011D-06	1.9269D-07
2.8863D-05	4.6232D-06	-2.6569D-07	-6.6103D-09	5.8753D-06	5.5398D-07
-3.2984D-05	-5.2557D-06	6.1975D-06	4.7064D-07	1.1888D-06	5.8279D-08
-7.0483D-07	-2.4228D-08	-7.0303D-07	-8.6310D-08	4.3167D-06	3.7327D-07
-5.8482D-05	-2.5429D-06	1.6171D-06	6.4643D-07	-8.4236D-05	-6.3966D-06
-8.8473D-05	-3.6919D-06	-7.6029D-05	-5.8715D-06	-7.5258D-05	-5.1005D-06
-4.1908D-05	-1.0318D-07	7.3849D-06	1.6809D-06	-6.6600D-05	-5.1007D-06
-5.6920D-05	7.4885D-07	-5.8471D-05	-4.6589D-06	-5.0614D-05	-2.7637D-06
1.0576D-04	4.4847D-06	-1.2554D-04	-9.1398D-06	2.5962D-06	2.3583D-07
-6.3160D-06	-3.1181D-07	1.0766D-05	8.5147D-07	5.1829D-05	4.5183D-06
6.9964D-05	-4.6275D-07	-9.0231D-05	-6.1417D-06	2.0253D-06	1.8088D-07
-7.6333D-06	-4.0031D-07	1.0163D-05	7.5270D-07	4.7045D-05	4.8020D-06
-4.7501D-05	-1.8543D-06	1.3526D-05	1.6561D-06	6.9296D-05	5.3023D-06
9.4680D-05	4.0908D-06	7.7535D-05	5.9232D-06	-8.7067D-05	-6.1168D-06
-2.8617D-05	7.7730D-07	1.8160D-05	2.5934D-06	5.2281D-05	4.2330D-06
6.4494D-05	-1.3610D-07	6.0539D-05	4.6661D-06	-6.1307D-05	-3.7939D-06
8.5565D-06	3.5696D-07	-5.5613D-06	-6.0507D-07	1.1099D-05	1.0141D-06
-8.6231D-06	-4.3020D-07	6.1087D-06	7.2875D-07	1.1124D-05	1.0553D-06
8.5669D-06	4.7893D-07	-6.8965D-06	-5.9712D-07	-1.0332D-05	-1.0231D-06
-8.6833D-06	-3.4236D-07	-1.2737D-05	-1.2903D-06	-2.5090D-07	1.0882D-07
8.5772D-06	4.0932D-07	1.2346D-05	1.1920D-06	-7.7738D-07	7.1315D-09
-8.6659D-06	-4.4756D-07	6.5458D-06	5.5660D-07	-1.0867D-05	-1.1610D-06
1.5412D-05	-2.3124D-04	1.5760D-04	-1.9717D-03	-5.2474D-06	5.6083D-05
2.2026D-06	-2.6672D-05	1.5204D-06	-1.8269D-05	-3.2657D-05	4.1840D-04
1.6412D-06	1.4229D-05	2.1401D-05	-2.5377D-04	-9.1351D-05	1.0918D-03
1.5412D-05	-2.3124D-04	1.5760D-04	-1.9717D-03	-5.2474D-06	5.6083D-05
2.2026D-06	-2.6672D-05	1.5204D-06	-1.8269D-05	-3.2657D-05	4.1840D-04
1.6412D-06	1.4229D-05	2.1401D-05	-2.5377D-04	-9.1351D-05	1.0918D-03
-9.5349D-06	1.3878D-04	1.2924D-05	-1.6376D-04	-8.3669D-05	1.0609D-03
1.2436D-05	-1.8677D-04	-7.8320D-05	9.8880D-04	1.1025D-04	-1.3904D-03
3.7488D-07	7.3958D-06	6.9010D-05	-8.1307D-04	6.3570D-05	-7.6382D-04
-9.5349D-06	1.3878D-04	1.2924D-05	-1.6376D-04	-8.3669D-05	1.0609D-03
1.2436D-05	-1.8677D-04	-7.8320D-05	9.8880D-04	1.1025D-04	-1.3904D-03
3.7488D-07	7.3958D-06	6.9010D-05	-8.1307D-04	6.3570D-05	-7.6382D-04
-5.9978D-06	9.1925D-05	1.6535D-05	-1.9646D-04	7.9256D-05	-1.0[illegible]73D-03
-1.4665D-05	2.1141D-04	8.6784D-05	-1.0805D-03	1.0724D-04	-1.35[illegible]D-03

8.5674D-07	1.6483D-05	-9.0342D-05	1.0725D-03	2.6527D-05	-3.2121D-04
-5.9978D-06	9.1925D-05	1.6535D-05	-1.9646D-04	7.9256D-05	-1.0073D-03
-1.4665D-05	2.1141D-04	8.6784D-05	-1.0805D-03	1.0724D-04	-1.3589D-03
8.5674D-07	1.6483D-05	-9.0342D-05	1.0725D-03	2.6527D-05	-3.2121D-04
3.3147D-05	-6.0803D-04	-9.4317D-05	1.1415D-03	-8.6645D-05	1.0648D-03
-5.9463D-05	1.1204D-03	-8.9868D-05	1.0878D-03	1.2697D-05	-1.5117D-04
4.1958D-05	-8.6694D-04	1.0598D-04	-1.2699D-03	-6.1153D-06	9.5649D-05
2.3306D-05	-4.6071D-04	-1.2003D-04	1.4155D-03	-1.0053D-04	1.2247D-03
-3.8672D-05	8.7774D-04	-2.8405D-05	1.8673D-04	-5.4439D-07	5.0723D-06
-5.5100D-06	7.0784D-05	-9.9224D-08	1.7458D-06	8.4057D-05	-1.0159D-03
7.5574D-06	-1.0252D-04	-5.7334D-07	7.1291D-06	-9.3949D-05	1.1852D-03
-1.1480D-04	2.2336D-03	-4.0823D-06	-1.8343D-04	-4.1255D-07	1.3152D-06
3.5735D-05	-6.6491D-04	-9.0079D-05	1.0969D-03	9.0349D-05	-1.1030D-03
5.7298D-05	-1.0879D-03	8.9129D-05	-1.0809D-03	9.7647D-06	-1.1622D-04
-3.9766D-05	8.3318D-04	-1.0393D-04	1.2500D-03	-2.0471D-06	4.5780D-05
2.5637D-05	-5.1792D-04	-1.1435D-04	1.3545D-03	1.0696D-04	-1.2935D-03
2.3803D-05	-4.9976D-04	5.6849D-05	-7.1346D-04	4.8071D-05	-5.1544D-04
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9.5802D-05	-1.8775D-03	-4.3590D-05	4.4071D-04	-1.9728D-05	4.2969D-04
6.3852D-05	-1.2055D-03	7.1081D-05	-9.3899D-04	4.1094D-05	-4.1907D-04
-6.8179D-05	1.2719D-03	6.3046D-05	-7.6280D-04	-5.4734D-07	9.3848D-06
2.9479D-06	-3.1261D-05	-2.2825D-06	2.5928D-05	-1.4252D-04	1.7473D-03
-3.1334D-06	3.1527D-05	4.0019D-06	-4.4677D-05	1.7613D-04	-2.1141D-03
-4.8168D-05	9.7792D-04	6.4678D-05	-8.0092D-04	-5.0623D-07	8.5861D-06
1.5645D-05	-3.7894D-04	5.5952D-05	-7.1388D-04	-4.8330D-05	5.1819D-04
3.7458D-05	-7.9071D-04	-4.8231D-05	5.1507D-04	-3.8168D-07	-1.1133D-04
-1.0482D-04	1.9809D-03	4.1774D-05	-4.2606D-04	-2.0337D-05	4.3658D-04
5.2043D-05	-1.0297D-03	6.8729D-05	-9.2496D-04	-4.2966D-05	4.3848D-04
6.5114D-08	-1.6614D-06	-7.2685D-05	9.7575D-04	1.4148D-06	-1.4101D-05
-1.4792D-05	2.7195D-04	-1.2582D-06	9.3898D-06	-7.1559D-05	9.7400D-04
-1.9562D-07	3.3878D-06	-2.4307D-05	3.3412D-04	9.5736D-05	-1.2305D-03
9.7196D-07	-2.0055D-05	-1.0318D-04	1.3290D-03	2.2162D-05	-2.8700D-04
-2.5117D-05	4.6085D-04	7.3575D-08	-9.8121D-07	-4.5162D-08	1.0465D-06
3.8766D-05	-7.3038D-04	-5.7062D-05	8.5635D-04	-1.2206D-05	1.4295D-04
-6.4273D-05	1.2153D-03	1.3407D-05	-1.5271D-04	-5.7331D-05	8.6295D-04
8.6025D-06	-1.3711D-04	2.0945D-05	-2.4476D-04	-9.7592D-05	1.1493D-03
6.6621D-06	-1.1930D-04	9.9117D-05	-1.1559D-03	2.3729D-05	-2.7898D-04
-1.5184D-04	2.8672D-03	-6.0586D-05	8.9445D-04	-1.5043D-06	5.8176D-06
2.5060D-04	-4.7508D-03	2.7184D-05	-3.2763D-04	-6.7925D-05	9.9297D-04
-1.4015D-04	2.6609D-03	-5.6096D-05	8.2485D-04	-2.4670D-05	2.8923D-04
-2.5794D-04	4.8754D-03	3.4738D-06	-4.7866D-05	-7.3940D-05	1.0608D-03
2.9449D-04	-5.5711D-03	-7.9148D-05	1.1176D-03	-1.5892D-05	2.1413D-04
6.7085D-06	-1.1806D-04	1.1363D-05	-1.2706D-04	-5.0733D-05	7.7943D-04
5.8561D-04	-9.8057D-03	-8.0315D-05	2.9561D-04	1.2449D-03	-1.5174D-02
8.7561D-04	-1.4834D-02	1.1354D-03	-1.3695D-02	1.0367D-03	-1.3553D-02
4.3767D-04	-7.0086D-03	-1.7370D-04	1.3441D-03	1.0033D-03	-1.1997D-02
5.9363D-04	-9.5104D-03	8.9010D-04	-1.0533D-02	6.9433D-04	-9.1041D-03
-1.0509D-03	1.7733D-02	1.8072D-03	-2.2608D-02	-4.5977D-05	4.6785D-04
6.2964D-05	-1.0593D-03	-1.6648D-04	1.9393D-03	-8.3034D-04	9.3408D-03
-7.3370D-04	1.1695D-02	1.3124D-03	-1.6241D-02	-3.1421D-05	3.6544D-04
7.5666D-05	-1.2805D-03	-1.5595D-04	1.8300D-03	-7.7467D-04	8.4889D-03

4.5936D-04	-7.9638D-03	-2.7407D-04	2.4405D-03	-1.0198D-03	1.2484D-02
-9.4659D-04	1.5875D-02	-1.1531D-03	1.3965D-02	1.2236D-03	-1.5681D-02
2.9165D-04	-4.7779D-03	-3.4427D-04	3.2851D-03	-7.8988D-04	9.4203D-03
-6.7960D-04	1.0783D-02	-9.2145D-04	1.0903D-02	8.6211D-04	-1.1032D-02
-7.1566D-05	1.4353D-03	8.3246D-05	-1.0042D-03	-1.7904D-04	2.0001D-03
7.4806D-05	-1.4471D-03	-9.2900D-05	1.1040D-03	-1.7985D-04	2.0052D-03
-7.4932D-05	1.4383D-03	1.1616D-04	-1.2415D-03	1.6062D-04	-1.8636D-03
7.1392D-05	-1.4564D-03	2.0430D-04	-2.2971D-03	9.9145D-06	-4.2622D-05
-7.1947D-05	1.4394D-03	-1.9774D-04	2.2259D-03	1.8433D-05	-1.3821D-04
7.2658D-05	-1.4547D-03	-1.0987D-04	1.1785D-03	1.6999D-04	-1.9613D-03
3.8880D-02	1.3283D-03	3.5520D-01	2.9561D-02	-1.0108D-02	-9.5899D-04
4.4793D-03	3.7528D-04	3.2886D-03	2.9546D-04	-7.5378D-02	-6.1587D-03
-2.3826D-03	3.1360D-04	4.5713D-02	3.9865D-03	-1.9651D-01	-1.9227D-02
3.8880D-02	1.3283D-03	3.5520D-01	2.9561D-02	-1.0108D-02	-9.5899D-04
4.4793D-03	3.7528D-04	3.2886D-03	2.9546D-04	-7.5378D-02	-6.1587D-03
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-2.3327D-02	-9.9899D-04	2.9505D-02	2.4076D-03	-1.9114D-01	-1.5722D-02
3.1407D-02	9.9577D-04	-1.7812D-01	-1.4723D-02	2.5051D-01	2.0678D-02
-1.2586D-03	1.2336D-04	1.4628D-01	1.4821D-02	1.3753D-01	1.2928D-02
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3.1407D-02	9.9577D-04	-1.7812D-01	-1.4723D-02	2.5051D-01	2.0678D-02
-1.2586D-03	1.2336D-04	1.4628D-01	1.4821D-02	1.3753D-01	1.2928D-02
-1.5461D-02	-3.7255D-04	3.5397D-02	3.0670D-03	1.8147D-01	1.4903D-02
-3.5545D-02	-1.3675D-03	1.9464D-01	1.6291D-02	2.4483D-01	2.0125D-02
-2.7654D-03	1.4068D-04	-1.9303D-01	-1.8788D-02	5.7747D-02	6.1561D-03
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-2.7654D-03	1.4068D-04	-1.9303D-01	-1.8788D-02	5.7747D-02	6.1561D-03
1.0203D-01	5.6298D-03	-2.0565D-01	-1.7759D-02	-1.9185D-01	-1.6599D-02
-1.8803D-01	-1.0008D-02	-1.9594D-01	-1.7295D-02	2.7210D-02	2.7922D-03
1.4548D-01	7.3541D-03	2.2875D-01	2.0374D-02	-1.7222D-02	-1.3780D-03
7.7289D-02	4.1603D-03	-2.5500D-01	-2.2826D-02	-2.2066D-01	-1.9253D-02
-1.4724D-01	-7.6526D-03	-3.3625D-02	-5.8064D-03	-9.1902D-04	-2.4720D-05
-1.1893D-02	-8.8811D-04	-3.1067D-04	-5.5171D-05	1.8297D-01	1.6421D-02
1.7224D-02	1.2160D-03	-1.2886D-03	-5.4519D-05	-2.1350D-01	-1.8009D-02
-3.7480D-01	-2.0328D-02	3.3089D-02	-1.7409D-03	-2.4198D-04	5.0915D-06
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-1.3980D-01	-7.0291D-03	-2.2517D-01	-1.9910D-02	-8.2363D-03	-5.3835D-04
8.6916D-02	4.4614D-03	-2.4399D-01	-2.1798D-02	2.3304D-01	2.0567D-02
8.3840D-02	4.5744D-03	1.2849D-01	1.1047D-02	9.2839D-02	9.5443D-03
-1.2065D-01	-6.2421D-03	9.4595D-02	9.7448D-03	2.0801D-02	-2.4291D-04
3.1504D-01	1.7039D-02	-7.9364D-02	-8.7379D-03	-7.7443D-02	-3.0651D-03
2.0229D-01	1.1240D-02	1.6915D-01	1.3382D-02	7.5472D-02	8.3509D-03
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5.2589D-03	4.4443D-04	-4.6663D-03	-4.3377D-04	-3.1480D-01	-2.7048D-02
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-1.6409D-01	-8.4368D-03	1.4427D-01	1.2599D-02	-1.5497D-03	-1.0575D-04
6.3547D-02	3.2464D-03	1.2857D-01	1.0871D-02	-9.3337D-02	-9.5326D-03
1.3264D-01	7.2888D-03	-9.2757D-02	-9.5722D-03	2.0056D-02	-2.2944D-04
-3.3240D-01	-1.8493D-02	7.6716D-02	8.4670D-03	-7.8682D-02	-3.2202D-03

1.7277D-01	9.3206D-03	1.6662D-01	1.2941D-02	-7.8974D-02	-8.6050D-03
2.7872D-04	2.7081D-05	-1.7576D-01	-1.3561D-02	2.5393D-03	2.3741D-04
-4.5642D-02	-2.5394D-03	-1.6893D-03	-2.6756D-04	-1.7546D-01	-1.3373D-02
-5.6876D-04	-4.4392D-05	-6.0180D-02	-4.6067D-03	2.2164D-01	1.8201D-02
3.3647D-03	2.2923D-04	-2.3937D-01	-1.9582D-02	5.1698D-02	4.1843D-03
-7.7348D-02	-4.2957D-03	1.7667D-04	1.3970D-05	-1.8851D-04	-7.0728D-06
1.2247D-01	8.4943D-03	-1.5424D-01	-1.0763D-02	-2.5762D-02	-2.2677D-03
-2.0377D-01	-1.4160D-02	2.7511D-02	2.5112D-03	-1.5546D-01	-1.0785D-02
2.3018D-02	1.5590D-03	4.4101D-02	3.9170D-03	-2.0681D-01	-2.1007D-02
2.0005D-02	1.2302D-03	2.0796D-01	2.1340D-02	5.0289D-02	4.3555D-03
-4.8075D-01	-3.3379D-02	-1.6111D-01	-1.1450D-02	-1.0568D-03	-2.7930D-04
7.9659D-01	5.5514D-02	5.9022D-02	5.1413D-03	-1.7888D-01	-1.2748D-02
-4.4615D-01	-3.1195D-02	-1.4858D-01	-1.0557D-02	-5.2126D-02	-4.5407D-03
-8.1748D-01	-5.6840D-02	8.6107D-03	7.0962D-04	-1.9111D-01	-1.3833D-02
9.3413D-01	6.5025D-02	-2.0132D-01	-1.4758D-02	-3.8566D-02	-3.0614D-03
1.9811D-02	1.2706D-03	2.2891D-02	2.1377D-03	-1.4040D-01	-9.5749D-03
1.6459D+00	9.6773D-02	-5.3663D-02	-1.3662D-02	2.7347D+00	2.2661D-01
2.4897D+00	1.4522D-01	2.4678D+00	2.0674D-01	2.4420D+00	1.9004D-01
1.1767D+00	6.7493D-02	-2.4224D-01	-3.3970D-02	2.1621D+00	1.8280D-01
1.5967D+00	8.9101D-02	1.8981D+00	1.6252D-01	1.6407D+00	1.2442D-01
-2.9764D+00	-1.7420D-01	4.0736D+00	3.3011D-01	-8.4319D-02	-8.3446D-03
1.7786D-01	1.0079D-02	-3.4946D-01	-3.0186D-02	-1.6838D+00	-1.5035D-01
-1.9634D+00	-1.1100D-01	2.9265D+00	2.3701D-01	-6.5825D-02	-5.9973D-03
2.1495D-01	1.2780D-02	-3.2977D-01	-2.8257D-02	-1.5299D+00	-1.4367D-01
1.3366D+00	7.6378D-02	-4.4021D-01	-4.8966D-02	-2.2497D+00	-1.8597D-01
-2.6646D+00	-1.5677D-01	-2.5165D+00	-2.0996D-01	2.8256D+00	2.2374D-01
8.0219D-01	4.2784D-02	-5.9200D-01	-6.5281D-02	-1.6977D+00	-1.4433D-01
-1.8103D+00	-1.0362D-01	-1.9648D+00	-1.6777D-01	1.9882D+00	1.5489D-01
-2.4081D-01	-1.3112D-02	1.8087D-01	1.6354D-02	-3.6033D-01	-3.4447D-02
2.4281D-01	1.3469D-02	-1.9883D-01	-1.8290D-02	-3.6123D-01	-3.4592D-02
-2.4130D-01	-1.3709D-02	2.2367D-01	2.2099D-02	3.3573D-01	3.1118D-02
2.4438D-01	1.2925D-02	4.1377D-01	3.9545D-02	7.7085D-03	1.4852D-03
-2.4150D-01	-1.3118D-02	-4.0094D-01	-3.8132D-02	2.4920D-02	3.2963D-03
2.4408D-01	1.3205D-02	-2.1228D-01	-2.0965D-02	3.5332D-01	3.3080D-02

$\mathbf{D}_{sy}$ =

Columns 1 thru 6

7.5317D-08	2.1044D-08	1.8495D-07	1.2895D-07	-5.0491D-08	3.5935D-09
-9.9513D-09	1.8159D-08	-1.7481D-09	6.5538D-08	-1.6803D-10	2.2908D-08
-2.7717D-08	2.3615D-07	-1.1181D-08	6.0315D-07	-4.3462D-09	-4.4697D-08
7.5317D-08	2.1044D-08	1.8495D-07	1.2895D-07	-5.0491D-08	3.5935D-09
-9.9513D-09	1.8159D-08	-1.7481D-09	6.5538D-08	-1.6803D-10	2.2908D-08
-2.7717D-08	2.3615D-07	-1.1181D-08	6.0315D-07	-4.3462D-09	-4.4697D-08
3.2634D-08	-3.8455D-08	4.4480D-08	-8.8697D-08	3.6873D-08	-1.1970D-08
-1.0129D-08	6.9364D-08	3.7959D-08	2.1585D-07	-4.3061D-08	5.6128D-08
-2.2401D-07	-9.4447D-08	-5.1871D-07	-2.9016D-07	-1.8985D-07	-1.4195D-07
3.2634D-08	-3.8455D-08	4.4480D-08	-8.8697D-08	3.6873D-08	-1.1970D-08
-1.0129D-08	6.9364D-08	3.7959D-08	2.1585D-07	-4.3061D-08	5.6128D-08
-2.2401D-07	-9.4447D-08	-5.1871D-07	-2.9016D-07	-1.8985D-07	-1.4195D-07
2.9510D-09	-3.0873D-08	-9.2348D-09	-9.3996D-08	3.8757D-08	1.3949D-08

-3.4813D-08	-3.0675D-08	-9.6120D-08	-1.1317D-07	4.2376D-08	6.2918D-08
-3.5917D-08	2.6890D-08	4.2739D-07	-2.4821D-07	1.9275D-07	-1.4671D-07
2.9510D-09	-3.0873D-08	-9.2348D-09	-9.3996D-08	3.8757D-08	1.3949D-08
-3.4813D-08	-3.0675D-08	-9.6120D-08	-1.1317D-07	4.2376D-08	6.2918D-08
-3.5917D-08	2.6890D-08	4.2739D-07	-2.4821D-07	1.9275D-07	-1.4671D-07
-4.5991D-08	9.4434D-08	-1.5367D-07	9.4276D-08	-2.7736D-08	-2.9366D-08
-7.7699D-09	-6.9506D-08	-4.0567D-08	-2.6186D-07	7.9960D-08	-9.0532D-08
-3.2349D-08	2.2197D-08	-8.3291D-09	1.3179D-07	-5.5960D-08	1.0716D-07
-5.0992D-08	1.0585D-07	-1.8372D-07	6.0273D-08	2.9122D-08	-2.5354D-08
-4.7187D-08	9.2317D-08	-1.3191D-07	1.0009D-07	-1.6858D-08	-3.1780D-10
-1.1031D-08	-1.0545D-07	-1.2259D-08	-2.0281D-07	-2.2322D-09	-4.2191D-08
-3.5625D-09	9.4602D-08	1.0890D-08	2.1071D-07	3.1557D-09	8.4740D-08
-4.9012D-08	7.9349D-08	-1.7598D-07	-9.2917D-10	9.7462D-08	2.8545D-09
-1.1758D-07	2.2985D-08	-1.9958D-07	5.4523D-08	-2.6272D-08	1.9237D-08
1.9327D-08	-8.9365D-08	4.9441D-08	-1.3876D-07	-8.2951D-08	-8.9401D-08
-1.5781D-08	1.0727D-07	-7.3895D-09	2.2710D-07	5.8651D-08	1.0355D-07
-1.2964D-07	1.8278D-08	-2.3699D-07	1.0874D-08	3.0359D-08	1.4680D-08
-1.3110D-07	-5.5911D-08	-2.2417D-07	-6.1877D-08	-5.5449D-08	6.1110D-09
4.6698D-08	-3.0503D-08	4.8387D-08	-1.1732D-07	-9.7296D-08	-9.6999D-08
-4.1720D-08	3.0975D-08	7.3593D-09	1.9833D-07	7.8364D-08	9.6315D-08
-1.2713D-07	-3.6477D-08	-2.0116D-07	-1.8691D-08	-4.6983D-08	-2.6686D-09
-9.6937D-08	-4.0340D-08	-2.4951D-07	-1.0131D-07	-7.7997D-08	3.5004D-09
6.9207D-08	-2.1694D-08	4.1770D-08	-1.6664D-07	-5.1066D-10	-1.2893D-07
-9.1980D-08	-8.0176D-09	-5.3083D-08	1.6346D-07	3.8424D-10	1.3885D-07
-8.6606D-08	1.0226D-08	-2.0555D-07	-6.5733D-09	-9.7886D-08	2.3486D-09
-3.5049D-08	1.2446D-08	-1.8047D-07	-2.6058D-08	-5.9313D-08	-5.3623D-09
1.0561D-08	-2.4354D-08	-2.7086D-08	-2.1749D-07	9.6967D-08	-1.0185D-07
-7.5830D-08	-5.1583D-08	-3.0942D-08	1.1781D-07	-7.9119D-08	1.0527D-07
-3.9444D-08	8.1957D-08	-1.5558D-07	3.8184D-08	-5.2173D-08	1.2901D-09
-8.9897D-08	3.8379D-08	-2.0345D-07	2.4056D-08	-2.5482D-08	-3.4873D-09
3.6466D-08	-5.8344D-08	9.4288D-09	-2.1364D-07	7.9829D-09	-1.1339D-07
-7.0058D-08	3.5105D-08	-3.8401D-08	1.8586D-07	1.4692D-08	1.2989D-07
-1.0343D-07	5.8542D-08	-2.1672D-07	3.1883D-08	1.7117D-08	3.3675D-09
-7.0441D-09	-1.4405D-08	-2.8215D-08	-5.1550D-08	1.6070D-08	1.0627D-09
1.0921D-07	-1.4823D-07	2.8484D-07	-2.9880D-07	1.6022D-07	9.0595D-10
2.4950D-08	2.4328D-07	2.3681D-07	8.8935D-07	-1.7504D-07	1.9424D-07
6.0989D-08	2.6970D-07	1.3683D-08	9.1700D-07	-8.5909D-10	1.6329D-07
-2.0099D-07	-6.6138D-08	-8.8228D-07	-7.0491D-09	-3.0706D-07	1.1801D-09
3.6164D-07	2.8894D-07	1.0440D-06	1.0351D-06	-3.4392D-07	-1.0118D-09
-4.0142D-07	-5.0937D-07	-1.0619D-06	-1.4101D-06	6.9098D-07	2.0623D-07
3.5596D-07	2.8379D-07	1.0297D-06	1.0288D-06	-3.3762D-07	-3.4811D-09
2.8766D-07	6.9314D-07	1.0162D-06	2.2765D-06	-6.9684D-07	1.9285D-07
-2.3073D-07	-7.6001D-07	-7.5125D-07	-2.1562D-06	8.5934D-07	5.2673D-10
-6.5479D-08	9.1307D-08	-2.5112D-08	4.2547D-07	2.7244D-09	1.9254D-07
1.3070D-06	-2.0838D-07	1.3580D-06	1.3202D-07	2.3782D-07	1.8935D-07
-2.0840D-07	1.2641D-06	1.0472D-07	1.6767D-06	-2.2573D-07	2.5848D-07
1.3580D-06	1.0469D-07	3.0906D-06	1.2131D-06	2.1199D-07	1.3587D-07
1.3196D-07	1.6766D-06	1.2131D-06	4.6892D-06	-8.1145D-07	5.4155D-07
2.3791D-07	-2.2579D-07	2.1213D-07	-8.1153D-07	1.0950D-06	8.4157D-08
1.8931D-07	2.5841D-07	1.3584D-07	5.4147D-07	8.4122D-08	1.4771D-06
1.7995D-07	-8.0099D-07	8.6194D-08	-2.8859D-06	1.7052D-06	6.3348D-08

1.4076D-07	5.6795D-07	8.6029D-08	1.6636D-06	8.9883D-08	1.3352D-06
2.6856D-07	2.0712D-07	7.5450D-07	4.6596D-07	2.3980D-07	-1.8909D-07
-2.0717D-07	2.2653D-07	-4.7189D-07	-8.0986D-09	2.2549D-07	2.5887D-07
7.4927D-07	4.9701D-07	2.4758D-06	1.4964D-06	1.8865D-07	-1.3732D-07
-4.4736D-07	6.5609D-10	-1.4653D-06	-7.3225D-07	8.0359D-07	5.6254D-07
4.3223D-08	-6.3582D-08	-2.2844D-07	-4.9435D-07	-1.6198D-07	-2.7716D-07
3.1498D-07	-5.9415D-08	3.9803D-07	-4.5254D-07	1.5577D-07	-2.8496D-07
1.9826D-07	-2.4221D-07	5.7305D-07	-1.2316D-07	3.2555D-08	6.9192D-08
6.0415D-08	1.7890D-09	2.9056D-07	4.5824D-07	-1.0635D-07	3.0235D-07
-1.5927D-07	2.7866D-07	-3.4083D-07	5.6898D-07	1.1158D-07	2.9267D-07
-3.2531D-07	6.8493D-09	-6.5796D-07	2.4310D-08	-3.1346D-08	5.1537D-08
-9.2057D-09	-1.6516D-08	-2.1057D-08	-6.6148D-09	-5.7784D-08	1.8838D-09
8.0665D-09	1.1574D-08	4.6653D-09	9.6013D-09	-2.7693D-09	-1.6676D-09
-1.5410D-09	1.3365D-08	-7.4900D-09	1.4659D-08	-1.0065D-08	9.8852D-09
-9.2057D-09	-1.6516D-08	-2.1057D-08	-6.6148D-09	-5.7784D-08	1.8838D-09
8.0665D-09	1.1574D-08	4.6653D-09	9.6013D-09	-2.7693D-09	-1.6676D-09
-1.5410D-09	1.3365D-08	-7.4900D-09	1.4659D-08	-1.0065D-08	9.8852D-09
9.3463D-09	1.2686D-08	2.9393D-09	1.4100D-08	1.5481D-09	-2.8385D-09
-6.5789D-09	-5.6706D-09	5.7437D-09	-1.2845D-08	2.1965D-08	2.1268D-09
3.2184D-10	4.9184D-09	-3.8336D-09	3.1574D-09	-2.1169D-09	-7.9872D-09
9.3463D-09	1.2686D-08	2.9393D-09	1.4100D-08	1.5481D-09	-2.8385D-09
-6.5789D-09	-5.6706D-09	5.7437D-09	-1.2845D-08	2.1965D-08	2.1268D-09
3.2184D-10	4.9184D-09	-3.8336D-09	3.1574D-09	-2.1169D-09	-7.9872D-09
-1.5989D-08	-2.1382D-08	-1.0581D-08	-1.7885D-08	1.8105D-09	2.2306D-09
-2.8304D-08	-4.4593D-08	-2.4582D-08	-3.2573D-08	-1.5878D-08	2.0663D-09
1.1422D-08	6.5064D-10	1.8290D-08	-5.4201D-09	-7.8540D-09	9.2150D-10
-1.5989D-08	-2.1382D-08	-1.0581D-08	-1.7885D-08	1.8105D-09	2.2306D-09
-2.8304D-08	-4.4593D-08	-2.4582D-08	-3.2573D-08	-1.5878D-08	2.0663D-09
1.1422D-08	6.5064D-10	1.8290D-08	-5.4201D-09	-7.8540D-09	9.2150D-10
2.3687D-09	3.1539D-09	7.1289D-09	2.1226D-09	2.4847D-08	4.7518D-09
2.5152D-08	2.5969D-08	2.7426D-08	1.4586D-08	-1.9837D-08	2.0330D-09
-2.4660D-08	-2.5956D-08	-2.7980D-08	-1.3038D-08	3.5306D-08	-8.5964D-09
-1.4218D-09	-1.2847D-08	6.7293D-09	-9.4405D-09	1.5376D-08	9.0194D-09
3.5406D-08	4.0502D-09	3.0667D-08	-2.0090D-09	-1.3218D-07	1.0582D-08
-1.0208D-09	-1.0842D-08	2.9793D-09	-1.1562D-08	5.2634D-09	-7.2879D-09
1.6920D-08	2.6854D-08	9.0174D-09	2.2985D-08	-5.9275D-09	-1.2775D-09
4.4200D-08	-5.2074D-09	3.6102D-08	-6.7861D-09	-1.8968D-07	1.4596D-08
-4.3013D-09	-1.8624D-08	9.0187D-09	-2.1982D-08	2.9160D-08	-4.8961D-09
-2.3814D-08	-2.7930D-08	-2.5288D-08	-1.7097D-08	1.9731D-08	-4.6176D-09
3.8270D-08	4.1077D-08	3.7946D-08	2.3945D-08	-3.4339D-08	9.9875D-10
-2.3063D-09	-3.2250D-08	1.4315D-08	-3.3416D-08	2.0739D-08	-6.7319D-09
3.2428D-09	-1.4056D-08	6.3110D-10	-1.0421D-08	5.6774D-09	-1.7961D-08
-1.1273D-08	2.9027D-08	-1.6229D-08	2.2965D-08	-2.1645D-08	2.1699D-08
2.3425D-08	-2.2855D-08	2.4927D-08	-1.9444D-08	3.0472D-08	-3.4490D-08
1.1692D-09	-3.1238D-08	-1.5829D-09	-2.3507D-08	-1.4307D-08	-1.8310D-08
1.5026D-08	2.4794D-08	5.0316D-09	2.1096D-08	-3.9084D-08	2.6243D-10
6.9699D-09	2.0977D-08	-5.2762D-10	2.1652D-08	-4.0033D-09	7.4039D-09
5.8326D-09	-1.1998D-08	1.1768D-08	-1.7137D-08	4.7997D-09	-1.7782D-08
2.1204D-08	2.9700D-08	9.5136D-09	2.3095D-08	-6.0131D-08	1.7137D-09
-4.3210D-08	-5.2572D-08	-3.9214D-08	-3.1568D-08	7.3168D-09	1.4997D-08
-5.7117D-08	-8.6693D-08	-3.7702D-08	-6.2950D-08	1.5683D-08	2.3003D-08

8.9065D-08	1.2307D-07	6.1878D-08	9.0946D-08	-2.3458D-08	-3.4933D-08
-5.4323D-08	-8.0893D-08	-4.7698D-08	-5.2908D-08	-1.2100D-08	1.8769D-08
5.9059D-09	2.9759D-08	9.7646D-09	1.9297D-08	5.5213D-08	-3.0995D-09
3.6091D-08	3.9536D-08	2.5171D-08	3.1165D-08	-8.5332D-09	-1.4163D-08
-1.8959D-08	-1.5980D-08	-9.1662D-09	-1.6299D-08	2.1649D-08	4.9131D-09
1.1283D-09	1.7267D-08	9.9690D-09	8.0144D-09	5.1996D-08	5.1917D-10
5.8395D-09	7.6588D-09	4.2813D-09	5.8504D-09	-9.6304D-09	4.9336D-10
-9.5117D-09	3.2524D-08	-4.7766D-09	2.3227D-08	1.0694D-07	-4.7571D-09
7.1157D-08	8.3079D-08	5.0679D-08	6.2100D-08	-3.1942D-08	-2.6004D-08
-1.2436D-08	2.2644D-09	-1.5966D-08	7.4488D-09	8.8680D-10	1.3122D-08
-4.9082D-09	9.8759D-09	-1.2503D-08	1.0323D-08	1.0561D-08	-7.0714D-09
4.6661D-08	1.0785D-07	3.6911D-08	7.7782D-08	5.5851D-09	2.1084D-09
-2.8882D-08	-5.4846D-08	-2.3794D-08	-3.7470D-08	1.3316D-07	-3.5771D-08
4.5409D-08	1.0431D-07	3.4836D-08	7.6132D-08	1.8004D-10	3.7350D-09
1.3025D-07	1.6108D-07	9.4152D-08	1.1949D-07	-1.4031D-07	-1.7114D-08
-7.9710D-08	-7.0717D-08	-5.3460D-08	-5.3277D-08	2.4377D-07	-1.7154D-08
4.9594D-08	5.3610D-08	3.5356D-08	4.0036D-08	4.0488D-09	-2.7972D-08
5.9312D-09	-2.8400D-07	7.2501D-08	-3.0002D-07	-3.5948D-07	-4.8598D-08
-3.8946D-07	-3.6595D-07	-3.6651D-07	-2.8944D-07	-1.1401D-07	8.5047D-08
1.3304D-07	-1.5147D-07	1.6888D-07	-1.9879D-07	-4.6555D-07	-6.7669D-08
-1.9725D-07	-7.3562D-08	-2.1618D-07	-7.1172D-08	-1.3765D-07	6.0318D-08
-1.4721D-07	-3.0022D-07	-2.6607D-07	-1.0661D-07	-5.5707D-07	1.5248D-08
-2.2968D-07	-1.5878D-07	-1.9802D-07	-7.5363D-08	-1.7998D-09	2.0564D-07
-1.9387D-07	-3.0515D-07	-2.5737D-07	-1.2922D-07	-1.3588D-07	-1.6363D-08
-2.8659D-07	-2.1069D-07	-2.4128D-07	-1.1360D-07	8.2241D-09	2.3392D-07
7.7164D-09	-1.6389D-07	2.3144D-09	-1.0156D-07	-3.2834D-07	8.9945D-08
-1.7731D-07	-3.6792D-07	2.2334D-08	-3.3154D-07	1.7543D-07	8.7298D-08
-1.6838D-08	-1.8778D-07	-3.4586D-09	-1.3028D-07	-4.1573D-07	1.3193D-07
-2.0362D-07	-4.6364D-07	-2.5784D-08	-3.7819D-07	1.7847D-07	6.0468D-08
-2.7850D-08	1.3206D-08	-3.8817D-08	2.2825D-08	-6.4778D-08	4.7622D-08
-7.9541D-08	-7.9269D-08	-5.9338D-08	-5.0234D-08	5.3531D-08	4.6216D-08
4.7005D-08	9.2895D-08	2.8854D-08	6.4580D-08	1.7136D-08	-3.3682D-08
-2.7693D-08	1.4080D-08	-4.0428D-08	2.0685D-08	1.2581D-07	-3.0049D-08
7.5152D-08	2.7109D-08	7.8157D-08	6.7738D-09	-1.1738D-07	-3.7332D-09
7.1008D-09	-7.5303D-08	2.7032D-08	-6.9121D-08	-2.4404D-09	-2.7270D-08
-3.8781D-04	-4.9714D-04	-1.4337D-05	1.7336D-03	-8.7880D-04	-1.0928D-04
-5.7465D-04	9.5165D-05	3.5178D-05	-4.4721D-05	9.7891D-05	-1.9274D-03
-1.4065D-03	5.3395D-04	-1.1258D-05	-2.2666D-03	4.0675D-04	6.5902D-03
-3.8781D-04	-4.9714D-04	-1.4337D-05	1.7336D-03	-8.7880D-04	-1.0928D-04
-5.7465D-04	9.5165D-05	3.5178D-05	-4.4721D-05	9.7891D-05	-1.9274D-03
-1.4065D-03	5.3395D-04	-1.1258D-05	-2.2666D-03	4.0675D-04	6.5902D-03
2.8269D-04	-1.5381D-04	-9.6218D-04	-3.0473D-04	-4.4067D-04	5.2009D-04
-6.3086D-05	-7.8150D-04	1.5007D-03	6.5304D-04	4.5604D-04	1.9142D-04
-6.7813D-04	8.9858D-04	2.1689D-03	1.2761D-03	2.0247D-04	-1.4803D-03
2.8269D-04	-1.5381D-04	-9.6218D-04	-3.0473D-04	-4.4067D-04	5.2009D-04
-6.3086D-05	-7.8150D-04	1.5007D-03	6.5304D-04	4.5604D-04	1.9142D-04
-6.7813D-04	8.9858D-04	2.1689D-03	1.2761D-03	2.0247D-04	-1.4803D-03
-1.6367D-03	3.9843D-04	3.0125D-03	1.1240D-03	-5.5786D-04	-4.5278D-04
5.8907D-04	-1.1055D-03	1.1848D-03	4.1693D-03	-3.8901D-04	1.1310D-04
5.4844D-03	-3.6275D-03	-1.3861D-03	8.7891D-04	-4.1041D-04	-1.0202D-03
-1.6367D-03	3.9843D-04	3.0125D-03	1.1240D-03	-5.5786D-04	-4.5278D-04

5.8907D-04	-1.1055D-03	1.1848D-03	4.1693D-03	-3.8901D-04	1.1310D-04
5.4844D-03	-3.6275D-03	-1.3861D-03	8.7891D-04	-4.1041D-04	-1.0202D-03
7.4300D-05	-1.2130D-03	-2.7973D-04	-8.8815D-04	-9.7157D-04	1.2072D-03
3.1009D-04	-8.9520D-04	-3.8971D-04	-9.7755D-05	-5.3827D-04	2.9036D-04
6.1922D-04	1.6836D-03	-1.9637D-04	3.7034D-04	5.2856D-04	-3.2501D-04
-5.0391D-04	-1.6203D-03	-2.1972D-04	-7.7576D-04	-2.3107D-03	7.3245D-04
-1.9943D-04	-1.7493D-03	-1.0555D-04	-8.2941D-05	2.7864D-03	-7.9586D-05
3.4607D-04	9.2592D-04	8.4618D-04	7.9701D-04	-4.7221D-06	-1.2381D-04
-1.3933D-04	-8.3715D-04	-1.2210D-03	-6.2960D-04	-1.1323D-05	-1.6247D-03
-1.1204D-03	-2.0117D-03	-2.1874D-04	-8.7401D-05	-1.6779D-04	-1.1639D-04
1.5984D-03	7.4856D-05	9.3278D-04	1.8452D-04	-1.0260D-03	-9.6021D-04
1.5900D-04	1.5357D-03	3.2427D-04	1.0949D-03	5.4194D-04	2.2379D-04
-1.7494D-05	-9.3413D-04	-5.4432D-04	-1.7279D-03	-4.9622D-04	-1.6869D-04
1.0525D-03	-2.8778D-05	1.3983D-03	4.0711D-04	-2.3450D-03	-4.5362D-04
1.4820D-03	1.1882D-03	4.1825D-04	1.0113D-03	1.1516D-05	-2.0826D-04
-9.4172D-04	-4.8036D-04	1.8688D-04	5.4819D-04	1.8775D-03	6.9002D-04
7.9560D-04	1.2736D-03	-3.4263D-06	-5.4804D-04	-2.3606D-03	-1.8146D-04
1.4905D-03	1.5116D-03	1.7422D-04	1.2262D-03	-5.0833D-04	2.4367D-04
-3.1441D-04	1.5519D-04	3.5115D-04	5.0164D-05	1.6422D-03	-1.2581D-04
-1.5982D-03	-3.8257D-04	-6.6635D-04	-6.3881D-04	-3.4149D-05	1.4828D-03
1.8306D-03	1.5715D-03	8.9064D-04	3.4582D-04	2.8538D-05	-1.0279D-03
-3.9831D-04	-5.1854D-04	-1.4920D-04	3.1577D-04	9.2897D-04	-6.6128D-05
6.5246D-04	1.2588D-03	-3.1544D-04	-1.1874D-05	1.1066D-04	1.5541D-04
1.3288D-03	2.0430D-03	7.7167D-06	-2.0835D-04	-1.9748D-03	8.7872D-04
6.7286D-04	-2.5616D-04	-2.2529D-03	-1.4737D-03	2.4985D-03	-4.8471D-04
1.2347D-03	-8.0336D-04	-9.5580D-04	2.1006D-03	-3.0573D-04	-2.1857D-04
5.2538D-04	-6.8026D-04	3.1198D-04	-3.9779D-04	-6.5369D-04	8.2097D-05
-9.6220D-04	-5.0166D-04	-3.4184D-04	1.2665D-04	3.4117D-04	9.3819D-04
1.2733D-03	3.6229D-04	3.7402D-04	1.8623D-04	-3.5697D-04	-6.8077D-04
6.6124D-04	-8.2559D-04	2.1353D-04	-3.6367D-04	-1.7365D-03	-2.0983D-04
-3.3660D-04	-4.8932D-04	1.9815D-04	3.4171D-04	5.8194D-04	-4.6176D-05
1.0336D-03	1.2201D-04	1.7676D-03	-4.4260D-04	-3.5703D-04	1.2895D-04
-8.7601D-04	-3.3608D-04	-4.4510D-04	8.8425D-04	1.3040D-03	8.1600D-04
-2.8841D-03	2.4817D-03	1.5989D-04	-4.5066D-03	2.0012D-05	7.2983D-03
-5.2099D-03	3.4505D-03	4.3940D-03	-4.5439D-04	-5.4910D-04	-2.3133D-04
-7.9537D-04	-2.5432D-03	1.2894D-03	-8.5568D-04	2.9865D-03	-1.7652D-04
1.9515D-03	4.1188D-03	4.2523D-05	1.9336D-03	-3.8469D-03	9.8362D-04
-7.3966D-04	-2.1512D-03	1.0322D-03	-1.0705D-03	2.6050D-03	3.2922D-05
-2.9976D-03	-2.8003D-03	-9.5971D-04	5.4895D-04	4.5016D-03	7.0061D-04
3.2483D-03	3.7567D-03	2.0038D-03	1.0292D-03	-4.4684D-03	8.2716D-04
4.6743D-05	7.4477D-04	-4.5443D-04	6.2644D-04	-8.2871D-06	9.7985D-04
-4.1717D-02	8.5653D-03	-1.2493D-02	1.5059D-02	-4.8765D-03	-5.8676D-03
8.5653D-03	-3.7556D-02	1.6263D-02	-1.2405D-03	1.0027D-02	-8.5856D-03
-1.2493D-02	1.6263D-02	-4.5600D-02	-4.5618D-03	-9.6252D-03	-4.8535D-03
1.5059D-02	-1.2399D-03	-4.5617D-03	-5.0650D-02	-6.3055D-03	-5.0544D-04
-4.8762D-03	1.0027D-02	-9.6259D-03	-6.3060D-03	-3.0867D-02	-2.4467D-03
-5.8684D-03	-8.5866D-03	-4.8541D-03	-5.0576D-04	-2.4464D-03	-4.8137D-02
-8.2350D-03	-7.0951D-03	-1.1096D-03	1.4943D-02	9.1405D-03	-2.3406D-03
-5.1891D-03	-1.6117D-03	-4.0516D-03	-8.2483D-03	-3.5335D-03	-2.3237D-02
-9.4974D-03	-7.4012D-03	2.0970D-03	1.1882D-03	-5.9468D-03	5.2855D-03
8.5217D-03	-3.9399D-03	-7.7964D-04	-1.1960D-02	-1.0493D-02	-7.6090D-03

2.0966D-03	-3.9047D-04	-1.1182D-02	-9.1459D-03	-8.6185D-03	4.9891D-03
-1.8885D-03	-1.2208D-02	9.8723D-03	1.8642D-03	6.7726D-03	-1.2965D-03
-1.7808D-03	-2.9027D-03	-1.3169D-03	1.1087D-03	3.4916D-03	5.6106D-04
-1.0952D-03	-3.6027D-04	-5.4838D-04	-6.9652D-04	-3.5028D-03	9.9574D-04
-1.4069D-04	1.0226D-03	5.8188D-04	6.0049D-04	3.3905D-03	-8.9600D-05
2.0570D-03	2.8356D-03	-1.4569D-03	5.4074D-04	9.4381D-04	-7.6079D-04
-1.2633D-03	-3.2983D-03	9.5408D-04	-1.2380D-03	-8.5890D-04	-6.2913D-04
2.6198D-03	2.5462D-03	1.7689D-03	-2.8165D-04	-3.4701D-03	3.6277D-04

Columns 7 thru 12

-1.7059D-07	3.3563D-09	8.1285D-08	-1.7855D-08	1.9549D-07	-1.2574D-07
1.9040D-09	4.7086D-08	1.0558D-08	2.0505D-08	1.8363D-09	6.5356D-08
4.8430D-09	4.9449D-07	3.0518D-08	2.4086D-07	8.6617D-09	5.9333D-07
-1.7059D-07	3.3563D-09	8.1285D-08	-1.7855D-08	1.9549D-07	-1.2574D-07
1.9040D-09	4.7086D-08	1.0558D-08	2.0505D-08	1.8363D-09	6.5356D-08
4.8430D-09	4.9449D-07	3.0518D-08	2.4086D-07	8.6617D-09	5.9333D-07
1.5021D-07	-1.8020D-08	6.3692D-09	3.2580D-08	-4.6079D-09	9.3382D-08
-1.4865D-07	9.9818D-08	2.9015D-08	-3.3913D-08	9.1615D-08	-1.1812D-07
-5.1459D-07	-3.1088D-07	4.0342D-08	1.9295D-08	-4.3136D-07	-2.4112D-07
1.5021D-07	-1.8020D-08	6.3692D-09	3.2580D-08	-4.6079D-09	9.3382D-08
-1.4865D-07	9.9818D-08	2.9015D-08	-3.3913D-08	9.1615D-08	-1.1812D-07
-5.1459D-07	-3.1088D-07	4.0342D-08	1.9295D-08	-4.3136D-07	-2.4112D-07
1.5080D-07	2.3644D-08	2.7749D-08	3.7351D-08	4.0624D-08	8.4863D-08
1.5063D-07	1.0945D-07	6.5385D-09	6.5908D-08	-4.5209D-08	2.0994D-07
5.0644D-07	-3.0367D-07	2.1862D-07	-9.4685D-08	5.2944D-07	-2.9397D-07
1.5080D-07	2.3644D-08	2.7749D-08	3.7351D-08	4.0624D-08	8.4863D-08
1.5063D-07	1.0945D-07	6.5385D-09	6.5908D-08	-4.5209D-08	2.0994D-07
5.0644D-07	-3.0367D-07	2.1862D-07	-9.4685D-08	5.2944D-07	-2.9397D-07
-2.1200D-07	-2.0736D-08	-1.1505D-07	-2.0958D-08	-1.9988D-07	-4.8846D-08
1.2186D-07	-2.0297D-07	-2.4712D-08	-9.2177D-08	-5.5062D-08	-1.3890D-07
-3.5990D-08	2.1519D-07	1.9559D-08	1.0930D-07	1.0897D-08	2.2614D-07
-1.5264D-07	-2.3124D-08	-1.2798D-07	-1.6859D-08	-2.3843D-07	-6.0266D-09
-2.3052D-07	-2.4613D-09	-5.1786D-08	-9.2320D-08	-1.3870D-07	-9.7289D-08
-3.9102D-09	-1.6660D-07	9.9735D-09	-1.0988D-07	1.1994D-08	-2.0299D-07
5.2869D-09	1.7592D-07	3.9886D-09	1.0072D-07	-1.0723D-08	2.1158D-07
-9.6106D-08	2.4770D-09	-5.7311D-08	-8.1765D-08	-1.8815D-07	6.5068D-10
-2.1096D-07	7.0667D-09	-5.3218D-08	-9.4202D-08	-1.6215D-07	-9.1775D-08
-1.2864D-07	-2.0394D-07	1.4804D-08	-6.5493D-08	5.0211D-08	-2.5437D-07
4.3304D-08	2.1285D-07	2.5901D-08	1.8404D-08	3.0490D-10	1.7468D-07
-1.5174D-07	9.6318D-09	-6.0187D-08	-1.0694D-07	-1.9476D-07	-5.8690D-08
-1.4624D-07	3.5199D-09	-3.7229D-08	-8.8732D-09	-1.8579D-07	3.0796D-08
-1.0962D-07	-1.8778D-07	-1.1418D-08	-2.1866D-08	2.8821D-08	-2.1234D-07
1.7904D-08	1.7965D-07	8.1897D-08	-5.2361D-08	3.7150D-08	1.1553D-07
-2.0649D-07	-7.1668D-09	-3.9817D-08	-7.5215D-08	-1.5781D-07	-2.9143D-08
-1.0807D-07	2.8909D-09	-1.0127D-07	4.0079D-08	-2.5851D-07	1.0205D-07
-2.9226D-09	-2.2946D-07	-6.2561D-08	-1.4165D-08	-3.4250D-08	-1.5674D-07
2.9805D-09	2.4249D-07	8.3732D-08	-1.6276D-08	4.4202D-08	1.5281D-07
-2.2080D-07	1.3832D-09	-8.9476D-08	-9.6885D-09	-2.1249D-07	9.1172D-09
-1.4888D-07	-5.3496D-09	-1.2620D-07	5.6706D-08	-2.2372D-07	6.5894D-08
1.0405D-07	-1.9150D-07	-4.6899D-08	-2.6410D-08	-4.7719D-08	-1.1116D-07
-1.2628D-08	1.8904D-07	3.9042D-08	2.4407D-08	-1.2534D-08	1.8934D-07

-2.0930D-07	2.2573D-09	-1.1934D-07	3.7034D-08	-1.9773D-07	2.4004D-08
-1.6584D-07	-4.7720D-09	-9.4223D-08	-3.8040D-08	-2.1057D-07	-2.1410D-08
3.1061D-08	-2.1923D-07	-4.1235D-08	-3.7654D-08	-3.8310D-08	-1.4672D-07
1.0912D-08	2.3270D-07	5.4779D-08	8.6443D-09	2.5747D-08	1.6743D-07
-1.5656D-07	-1.1730D-09	-9.1427D-08	-6.9803D-08	-2.1617D-07	-3.5362D-08
5.8802D-08	1.3129D-09	-8.9601D-09	1.3442D-08	-3.0483D-08	5.0331D-08
7.2312D-07	6.7256D-09	1.0828D-07	1.4930D-07	2.9143D-07	2.8221D-07
-5.2096D-07	4.5113D-07	1.4677D-07	-5.8290D-08	2.8701D-07	-4.0217D-08
9.3789D-09	8.8262D-07	-6.4606D-08	2.7449D-07	-1.4896D-08	8.9735D-07
-9.1814D-07	-6.6700D-09	-1.9778D-07	6.2975D-08	-8.9909D-07	1.8875D-08
-8.0698D-07	-8.9343D-09	3.5923D-07	-2.8787D-07	1.0724D-06	-1.0371D-06
2.1171D-06	4.8450D-07	-2.8665D-07	6.8866D-07	-1.0559D-06	2.2310D-06
-8.0184D-07	-5.8358D-09	3.6594D-07	-2.7754D-07	1.0689D-06	-1.0222D-06
-2.1143D-06	4.4429D-07	4.1246D-07	-5.0670D-07	1.0958D-06	-1.3999D-06
2.8623D-06	3.2354D-08	-2.4348D-07	7.5326D-07	-7.8570D-07	2.1279D-06
1.5887D-08	4.5560D-07	5.9440D-08	9.6227D-08	1.8894D-08	4.2203D-07
1.7989D-07	1.4086D-07	2.6855D-07	-2.[illegible]706D-07	7.4928D-07	-4.4721D-07
-8.0090D-07	5.6807D-07	2.0719D-07	2.2649D-07	4.9714D-07	6.9060D-10
8.6085D-08	8.6109D-08	7.5447D-07	-4.7173D-07	2.4758D-06	-1.4651D-06
-2.8858D-06	1.6637D-06	4.6604D-07	-8.1681D-09	1.4965D-06	-7.3226D-07
1.7053D-06	8.9904D-08	2.3991D-07	2.2553D-07	1.8881D-07	8.0364D-07
6.3315D-08	1.3352D-06	-1.8905D-07	2.5878D-07	-1.3730D-07	5.6244D-07
5.3496D-06	8.1010D-08	1.6768D-07	7.8748D-07	6.0679D-08	2.8688D-06
8.0985D-08	2.4394D-06	-1.6080D-07	5.8514D-07	-1.0054D-07	1.6892D-06
1.6758D-07	-1.6088D-07	1.4536D-06	1.2330D-07	1.4918D-06	-1.8295D-07
7.8740D-07	5.8528D-07	1.2331D-07	1.1161D-06	-2.0929D-07	1.5425D-06
6.0546D-08	-1.0059D-07	1.4918D-06	-2.0923D-07	3.2325D-06	-1.2947D-06
2.8687D-06	1.6894D-06	-1.8289D-07	1.5425D-06	-1.2947D-06	4.5440D-06
-3.2262D-07	-5.7935D-07	-3.0932D-07	-4.9125D-08	-3.9479D-07	-4.3083D-07
3.0431D-07	-5.8142D-07	-2.8687D-08	-5.3134D-08	2.5176D-07	-4.8067D-07
5.3900D-07	4.9574D-08	3.2187D-07	-2.1309D-09	6.6552D-07	7.7932D-09
1.9377D-07	5.7132D-07	1.6930D-07	2.7752D-07	3.5167D-07	5.5534D-07
-1.7586D-07	5.5800D-07	-7.6658D-08	-5.3792D-09	-3.1414D-07	4.4575D-07
-5.3872D-07	2.2871D-08	-2.0950D-07	-2.4219D-07	-5.9331D-07	-1.1455D-07
-4.5282D-08	3.2443D-09	-2.7772D-09	1.5690D-08	-1.6312D-08	6.8888D-09
-1.6374D-09	2.3847D-09	-4.7480D-09	6.7419D-09	-2.5703D-09	6.6954D-09
-6.7189D-09	1.9199D-08	6.9729D-09	-1.1082D-08	6.0352D-09	-3.5358D-09
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5.0474D-10	6.8974D-09	-1.6142D-08	2.7917D-08	-9.0063D-09	2.3754D-08
1.8359D-08	-1.0768D-08	2.1759D-08	-4.4290D-08	1.7453D-08	-3.4766D-08
-3.6278D-09	-1.3981D-08	-6.1187D-09	-8.4807D-09	-1.4442D-08	-1.2532D-08
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5.9186D-11	-7.2557D-09	9.5668D-09	-1.7984D-08	2.5371D-09	-1.8178D-08
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-2.7404D-09	-2.2278D-09	1.1376D-08	-5.9131D-09	1.5961D-08	-1.5120D-09
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-1.2300D-08	-4.7386D-10	1.6793D-08	-3.1642D-08	2.0537D-08	-2.0609D-08
2.1714D-08	-6.4435D-09	-3.0719D-08	4.6142D-08	-3.1793D-08	2.9004D-08
1.4951D-08	1.9209D-08	2.0373D-09	3.0391D-08	1.8232D-08	3.2796D-08
-9.2863D-08	9.9732D-09	3.4139D-08	-9.6493D-09	2.9414D-08	-2.7631D-09
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-3.1236D-09	9.8792D-09	-8.9922D-09	1.4376D-08	-3.4131D-09	1.5858D-08
-1.3691D-07	1.2679D-08	4.0806D-08	-4.7011D-09	3.5017D-08	-6.4291D-10
2.3594D-08	-1.4409D-08	3.2646D-09	2.3667D-09	7.0421D-09	7.9859D-10
1.1983D-08	-4.3696D-09	-1.8444D-08	3.3612D-08	-2.2429D-08	2.0766D-08
-2.0906D-08	8.7513D-10	1.9720D-08	-3.3744D-08	2.3539D-08	-1.9739D-08
1.7384D-08	-1.8107D-08	6.3898D-10	2.0458D-08	8.2342D-09	1.3930D-08
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-3.0789D-08	-2.5150D-10	5.3798D-09	-2.6462D-08	-1.7847D-09	-2.2482D-08
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-4.4665D-08	1.6233D-09	1.2323D-08	-3.1491D-08	2.3525D-09	-2.4986D-08
2.8178D-09	1.8468D-08	2.2568D-09	2.0822D-08	4.3326D-10	1.5490D-08
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-5.9837D-09	-4.1727D-09	-2.5782D-08	3.5433D-08	-1.5854D-08	2.9208D-08
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-7.3464D-09	1.4047D-10	2.9500D-09	-8.8680D-09	2.3854D-09	-6.7908D-09
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-2.3635D-08	-1.6425D-08	-3.3319D-08	2.4641D-08	-2.3929D-08	1.9282D-08
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1.0950D-09	4.1640D-09	2.7839D-08	-1.1919D-07	2.3389D-08	-8.5881D-08
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-3.1527D-07	-1.6095D-07	7.3511D-08	1.2978D-07	2.8634D-08	7.1974D-08
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-1.7318D-07	-2.2465D-08	-1.9623D-07	3.1146D-07	-2.2835D-07	1.5249D-07
1.7394D-08	2.9111D-07	2.5083D-07	-2.4494D-07	2.3157D-07	-1.2416D-07
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-2.7368D-07	2.1207D-07	1.3533D-07	2.0588D-07	1.7461D-07	2.2731D-07

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1.9919D-03	1.1250D-03	-5.8689D-03	-2.9553D-03	1.4495D-03	7.6754D-04
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1.3283D-03	-1.0803D-03	3.1445D-05	-7.6143D-04	-1.2926D-03	7.7194D-04
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1.3283D-03	-1.0803D-03	3.1445D-05	-7.6143D-04	-1.2926D-03	7.7194D-04
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-2.0734D-04	4.0237D-05	-9.1907D-05	1.8318D-03	-1.2980D-05	8.2009D-05
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1.4341D-03	3.7978D-05	-2.6500D-04	1.9661D-03	7.3006D-04	1.1876D-03
9.7859D-04	1.8186D-03	-1.7215D-03	4.2481D-03	-2.9143D-04	1.9152D-03
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3.5414D-04	1.7901D-03	2.6788D-04	1.7492D-04	3.7695D-04	1.0916D-03
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-7.0957D-03	-1.6117D-03	-7.4002D-03	-3.9392D-03	-3.9026D-04	-1.2208D-02
-1.1093D-03	-4.0517D-03	2.0972D-03	-7.7965D-04	-1.1182D-02	9.8716D-03
1.4943D-02	-8.2486D-03	1.1884D-03	-1.1959D-02	-9.1462D-03	1.8642D-03
9.1401D-03	-3.5336D-03	-5.9467D-03	-1.0493D-02	-8.6194D-03	6.7732D-03
-2.3404D-03	-2.3236D-02	5.2858D-03	-7.6095D-03	4.9895D-03	-1.2965D-03
-5.3055D-02	1.3346D-04	-7.6098D-03	7.3163D-03	-1.8093D-03	-1.5206D-02
1.3353D-04	-4.2895D-02	6.0140D-03	-2.5161D-03	3.6747D-03	-7.6001D-03
-7.6100D-03	6.0141D-03	-4.5953D-02	-6.1433D-03	-1.7622D-02	-1.3232D-02
-7.3171D-03	-2.5163D-03	-6.1442D-03	-3.3107D-02	-1.2048D-02	3.7104D-03
-1.8087D-03	3.6748D-03	-1.7622D-02	-1.2047D-02	-4.5362D-02	4.3987D-03
-1.5206D-02	-7.6005D-03	-1.3233D-02	3.7105D-03	4.3984D-03	-5.0679D-02
6.0111D-04	1.4467D-03	9.6159D-04	-4.1877D-04	2.1054D-04	-7.9142D-04
-6.3394D-04	1.6703D-03	1.4427D-03	-3.2170D-03	1.1806D-03	1.0168D-03
-2.6525D-04	-1.6885D-03	-2.2441D-03	2.7468D-03	-1.5464D-03	-2.1892D-04
8.0562D-04	-1.2943D-04	8.7582D-04	-3.4951D-03	-1.1138D-03	-1.4419D-03
-7.5647D-04	2.0057D-04	-1.6160D-03	2.9693D-03	1.5998D-03	6.1080D-04
2.6303D-04	-1.5331D-03	2.2284D-04	1.1579D-03	-3.1246D-04	7.9138D-04

Columns 13 thru 18

-2.2223D-08	2.2332D-08	7.3393D-08	3.9056D-08	-3.9255D-08	-7.3250D-08
-3.0839D-08	-3.0862D-08	-4.2760D-09	2.1415D-08	2.1802D-08	-4.1881D-09
-1.5377D-07	-1.5336D-07	-5.2373D-08	1.3326D-07	1.3623D-07	-4.9896D-08
-2.2223D-08	2.2332D-08	7.3393D-08	3.9056D-08	-3.9255D-08	-7.3250D-08
-3.0839D-08	-3.0862D-08	-4.2760D-09	2.1415D-08	2.1802D-08	-4.1881D-09
-1.5377D-07	-1.5336D-07	-5.2373D-08	1.3326D-07	1.3623D-07	-4.9896D-08
6.1032D-10	4.0020D-08	3.7768D-08	1.5642D-08	-3.2746D-08	-3.7931D-08
-4.4649D-08	-6.1006D-08	-3.5764D-09	3.4631D-08	6.5385D-08	2.2875D-08
1.3581D-07	-5.0179D-08	-1.5377D-07	-1.5329D-07	-5.2512D-08	1.3288D-07
6.1032D-10	4.0020D-08	3.7768D-08	1.5642D-08	-3.2746D-08	-3.7931D-08
-4.4649D-08	-6.1006D-08	-3.5764D-09	3.4631D-08	6.5385D-08	2.2875D-08
1.3581D-07	-5.0179D-08	-1.5377D-07	-1.5329D-07	-5.2512D-08	1.3288D-07
-4.0348D-08	-1.0503D-09	3.8317D-08	3.2921D-08	-1.5497D-08	-3.7635D-08
-6.1294D-08	-4.4660D-08	2.2733D-08	6.5409D-08	3.4828D-08	-3.4891D-09
-5.2677D-08	1.3298D-07	1.3604D-07	-4.9864D-08	-1.5378D-07	-1.5340D-07
-4.0348D-08	-1.0503D-09	3.8317D-08	3.2921D-08	-1.5497D-08	-3.7635D-08
-6.1294D-08	-4.4660D-08	2.2733D-08	6.5409D-08	3.4828D-08	-3.4891D-09
-5.2677D-08	1.3298D-07	1.3604D-07	-4.9864D-08	-1.5378D-07	-1.5340D-07

6.1632D-08	-1.6586D-08	-1.8308D-07	-9.9884D-08	5.6669D-08	9.0793D-08
6.9207D-08	7.4858D-08	-9.8436D-09	-1.5328D-07	-5.1939D-08	1.8646D-08
-9.0436D-08	-1.0179D-07	2.0330D-08	1.8705D-07	6.3825D-08	-1.4095D-08
6.8651D-08	-1.4790D-08	-2.2827D-07	-1.3145D-07	8.0968D-08	1.1266D-07
2.9923D-08	-2.9974D-08	-1.2224D-07	-1.1239D-07	1.1256D-07	1.2216D-07
4.1637D-08	4.2028D-08	1.7683D-08	-5.3682D-08	-5.4536D-08	1.7506D-08
-6.9993D-08	-7.0421D-08	-2.8115D-09	8.1718D-08	8.2578D-08	-2.9219D-09
2.7383D-08	-2.7687D-08	-1.4094D-07	-1.4960D-07	1.5010D-07	1.4072D-07
1.6608D-08	-6.1505D-08	-9.0649D-08	-5.6620D-08	9.9986D-08	1.8269D-07
7.5074D-08	6.9487D-08	1.8818D-08	-5.1838D-08	-1.5398D-07	-1.0083D-08
-1.0196D-07	-9.0528D-08	-1.4189D-08	6.3687D-08	1.8767D-07	2.0424D-08
1.4714D-08	-6.8612D-08	-1.1262D-07	-8.0809D-08	1.3177D-07	2.2770D-07
-9.2669D-09	-7.6451D-08	-5.1094D-08	-2.1378D-08	4.5893D-08	1.0281D-07
1.2483D-07	9.7157D-08	5.1409D-09	-4.7078D-08	-1.1494D-07	-7.0635D-08
-1.7127D-07	-1.2032D-07	1.1398D-08	5.9194D-08	1.2344D-07	8.8681D-08
-3.6289D-09	-7.2915D-08	-7.4376D-08	-4.7238D-08	6.7965D-08	1.4560D-07
8.3191D-08	-8.2975D-08	-7.3496D-08	-2.9344D-08	2.9241D-08	7.3389D-08
1.6350D-07	1.6313D-07	-2.3174D-08	-8.8065D-08	-8.8002D-08	-2.3153D-08
-2.0779D-07	-2.0734D-07	3.8294D-08	1.0475D-07	1.0469D-07	3.8173D-08
9.6545D-08	-9.6189D-08	-9.5779D-08	-4.4139D-08	4.3974D-08	9.5538D-08
7.6460D-08	9.6172D-09	-1.0360D-07	-4.5929D-08	2.1203D-08	5.1503D-08
9.7033D-08	1.2408D-07	-7.0470D-08	-1.1470D-07	-4.6730D-08	5.0583D-09
-1.2050D-07	-1.7042D-07	8.8764D-08	1.2341D-07	5.8770D-08	1.1367D-08
7.2826D-08	3.9758D-09	-1.4661D-07	-6.7834D-08	4.7001D-08	7.4812D-08
4.4629D-08	-4.4539D-08	-1.0571D-07	-6.1012D-08	6.0971D-08	1.0543D-07
9.8503D-08	9.3711D-08	-7.2435D-09	-8.9060D-08	-8.4398D-08	-1.1787D-08
-1.3146D-07	-1.3135D-07	2.0594D-08	1.0377D-07	1.1351D-07	2.9541D-08
4.5141D-08	-5.1587D-08	-1.3333D-07	-8.4537D-08	9.2911D-08	1.4200D-07
4.0202D-09	-3.9791D-09	3.9044D-09	-3.9898D-09	4.0437D-09	-3.8927D-09
-1.0801D-07	1.0858D-07	2.8991D-07	1.6802D-07	-1.7007D-07	-2.8843D-07
-2.7209D-07	-2.5606D-07	3.0044D-08	2.3576D-07	2.2255D-07	4.0716D-08
-2.5440D-07	-2.5242D-07	-1.9445D-08	2.7298D-07	2.7493D-07	-2.0409D-08
1.7089D-07	-1.6931D-07	-3.0621D-07	-1.3503D-07	1.3543D-07	3.0356D-07
-1.2652D-07	1.3057D-07	2.7266D-07	1.8816D-07	-1.9155D-07	-2.7156D-07
-2.3557D-07	-2.9253D-07	5.5975D-08	1.9718D-07	2.5873D-07	1.5739D-08
-1.2786D-07	1.2365D-07	2.6896D-07	1.8810D-07	-1.8617D-07	-2.6622D-07
-2.9497D-07	-2.4040D-07	1.0797D-08	2.5969D-07	2.0536D-07	6.1961D-08
-8.4964D-08	7.6444D-08	3.1677D-07	1.4650D-07	-1.4022D-07	-3.1590D-07
-2.6386D-07	-2.6137D-07	3.6776D-08	2.2747D-07	2.2755D-07	3.3276D-08
4.3205D-08	3.1497D-07	1.9828D-07	6.0409D-08	-1.5926D-07	-3.2529D-07
-6.3574D-08	-5.9419D-08	-2.4219D-07	1.8112D-09	2.7865D-07	6.8535D-09
-2.2846D-07	3.9803D-07	5.7305D-07	2.9054D-07	-3.4081D-07	-6.5793D-07
-4.9433D-07	-4.5254D-07	-1.2315D-07	4.5825D-07	5.6897D-07	2.4303D-08
-1.6197D-07	1.5576D-07	3.2557D-08	-1.0635D-07	1.1157D-07	-3.1349D-08
-2.7715D-07	-2.8494D-07	6.9172D-08	3.0235D-07	2.9266D-07	5.1522D-08
-3.2262D-07	3.0430D-07	5.3900D-07	1.9377D-07	-1.7586D-07	-5.3871D-07
-5.7933D-07	-5.8140D-07	4.9550D-08	5.7132D-07	5.5799D-07	2.2849D-08
-3.0931D-07	-2.8671D-08	3.2185D-07	1.6930D-07	-7.6649D-08	-2.0950D-07
-4.9137D-08	-5.3134D-08	-2.1375D-09	2.7750D-07	-5.3685D-09	-2.4218D-07
-3.9479D-07	2.5178D-07	6.6550D-07	3.5166D-07	-3.1412D-07	-5.9331D-07
-4.3083D-07	-4.8066D-07	7.7787D-09	5.5532D-07	4.4575D-07	-1.1455D-07

5.3594D-07	3.0053D-07	-2.0889D-07	-3.2279D-07	-2.0880D-07	4.8855D-08
3.0053D-07	5.3471D-07	4.8973D-08	-2.0819D-07	-3.2279D-07	-2.0836D-07
-2.0889D-07	4.8974D-08	5.3611D-07	3.0090D-07	-2.0869D-07	-3.2267D-07
-3.2279D-07	-2.0819D-07	3.0090D-07	5.3489D-07	4.9290D-08	-2.0814D-07
-2.0880D-07	-3.2279D-07	-2.0869D-07	4.9290D-08	5.3635D-07	3.0084D-07
4.8854D-08	-2.0836D-07	-3.2267D-07	-2.0814D-07	3.0084D-07	5.3461D-07
1.4822D-09	-1.9232D-09	3.9235D-09	8.2072D-09	-8.2686D-09	-5.2241D-09
1.1570D-09	1.5213D-09	-1.0893D-09	6.1271D-11	-7.7204D-10	-9.1885D-10
6.2594D-09	6.8743D-09	-5.2120D-09	1.7972D-09	-3.8265D-09	-5.9507D-09
1.4822D-09	-1.9232D-09	3.9235D-09	8.2072D-09	-8.2686D-09	-5.2241D-09
1.1570D-09	1.5213D-09	-1.0893D-09	6.1271D-11	-7.7204D-10	-9.1885D-10
6.2594D-09	6.8743D-09	-5.2120D-09	1.7972D-09	-3.8265D-09	-5.9507D-09
4.5331D-09	3.2675D-09	-1.8856D-09	-6.0160D-10	-1.0883D-09	-4.0222D-09
-6.6118D-09	-3.6669D-09	1.0330D-09	-2.0603D-09	4.2123D-09	7.3492D-09
-3.1205D-09	-6.5494D-09	6.6282D-09	6.3462D-09	-4.7109D-09	8.7350D-10
4.5331D-09	3.2675D-09	-1.8856D-09	-6.0160D-10	-1.0883D-09	-4.0222D-09
-6.6118D-09	-3.6669D-09	1.0330D-09	-2.0603D-09	4.2123D-09	7.3492D-09
-3.1205D-09	-6.5494D-09	6.6282D-09	6.3462D-09	-4.7109D-09	8.7350D-10
-3.0034D-09	-4.2620D-09	3.5084D-09	1.7243D-09	8.8253D-11	1.9532D-09
-3.1849D-09	-7.4277D-09	7.2930D-09	4.6013D-09	-1.9948D-09	3.2232D-10
-4.4886D-09	1.8504D-09	-3.5073D-09	-5.9550D-09	6.3637D-09	6.4726D-09
-3.0034D-09	-4.2620D-09	3.5084D-09	1.7243D-09	8.8253D-11	1.9532D-09
-3.1849D-09	-7.4277D-09	7.2930D-09	4.6013D-09	-1.9948D-09	3.2232D-10
-4.4886D-09	1.8504D-09	-3.5073D-09	-5.9550D-09	6.3637D-09	6.4726D-09
4.3710D-09	6.4040D-09	-6.9402D-09	-8.1961D-09	5.5931D-09	-1.7027D-09
-4.6299D-09	4.8163D-09	-5.4268D-09	-2.9500D-09	3.9353D-09	7.3371D-09
4.8707D-09	-7.6133D-09	8.5097D-09	3.7663D-09	-4.3237D-09	-7.9156D-09
4.8883D-09	8.8069D-09	-9.4470D-09	-1.1975D-08	9.0449D-09	-1.3386D-09
-8.0073D-09	9.6389D-09	-9.6368D-09	-3.3788D-09	3.8184D-09	9.5222D-09
-5.2152D-09	-6.1601D-09	4.9948D-09	2.5212D-10	1.7084D-09	4.5056D-09
4.0105D-09	5.0632D-09	-3.8753D-09	-2.8403D-10	-1.8281D-09	-3.2207D-09
-9.9474D-09	1.3028D-08	-1.1831D-08	-3.0697D-09	4.5017D-09	1.1794D-08
-6.1907D-09	-5.1501D-09	2.1393D-09	-6.4557D-09	7.7937D-09	7.1452D-09
2.9982D-09	-6.4950D-09	6.7830D-09	2.9201D-09	-3.3673D-09	-5.8664D-09
-5.8187D-09	6.4975D-09	-7.3398D-09	-3.4178D-09	3.8590D-09	8.8558D-09
-8.2707D-09	-5.6492D-09	2.0825D-09	-9.9374D-09	1.1681D-08	9.7967D-09
-3.2137D-09	-9.1669D-09	8.7261D-09	7.9431D-10	1.0765D-10	1.1518D-09
2.6640D-09	6.1802D-09	-4.6031D-09	1.0912D-08	-1.0354D-08	-3.4985D-09
-3.2104D-09	-9.5210D-09	7.3138D-09	-1.2967D-08	1.1200D-08	3.4229D-09
-3.6097D-09	-9.5198D-09	8.7481D-09	-1.4418D-09	1.6261D-09	9.5113D-10
-1.0204D-09	1.6478D-09	1.6506D-10	7.1922D-09	-6.0762D-09	2.6722D-10
8.3309D-09	9.2550D-09	-7.2980D-09	-1.0157D-09	-2.2033D-09	-7.0258D-09
-1.1924D-08	-1.3129D-08	1.0643D-08	1.4449D-09	2.6213D-09	1.0271D-08
-2.4171D-09	2.7653D-09	-1.1690D-09	7.4018D-09	-6.5176D-09	1.5026D-09
8.3207D-09	2.1386D-09	-8.9900D-10	-9.2256D-10	-5.5418D-10	-9.4112D-09
5.1406D-09	3.0426D-09	-4.2107D-09	-9.8550D-09	8.7919D-09	-4.3448D-09
-7.0033D-09	-2.4882D-09	4.6166D-09	1.1230D-08	-9.5776D-09	7.2071D-09
8.1409D-09	1.9247D-09	-1.1326D-09	-3.4242D-09	1.4908D-09	-9.8652D-09
3.7263D-10	-2.0240D-10	-6.6434D-10	-7.0916D-10	7.2283D-10	1.1910D-09
4.1121D-10	1.6981D-09	-6.9030D-10	-3.4424D-10	-8.6949D-10	4.1172D-10
-3.5238D-09	-3.9779D-09	2.4639D-09	8.8742D-10	1.1522D-09	3.1994D-09

-1.0371D-09	2.9226D-10	-1.8836D-09	-3.3041D-09	3.6480D-09	3.1658D-09
-6.2368D-10	1.0872D-09	-7.4897D-10	9.4040D-10	-5.8245D-10	8.9341D-10
4.5522D-09	-3.0041D-09	2.1513D-09	1.3157D-09	-2.0727D-09	-3.7941D-09
-4.1610D-09	7.5630D-10	8.6262D-10	4.0571D-09	-4.0369D-09	5.0381D-09
8.0684D-09	7.0541D-09	-5.3833D-09	1.0718D-09	-3.3974D-09	-7.7929D-09
8.3389D-10	-5.7805D-09	6.7901D-09	8.4333D-09	-7.7083D-09	-3.5641D-09
-2.7991D-09	7.3739D-09	-5.7768D-09	1.0346D-08	-8.0702D-09	5.6975D-09
8.2252D-09	-1.6887D-08	1.4439D-08	-1.1463D-08	6.5856D-09	-1.1129D-08
-1.4532D-09	8.6877D-09	-6.8772D-09	9.5446D-09	-7.9584D-09	4.3558D-09
-1.0363D-08	1.3489D-08	-9.0963D-09	1.2229D-08	-9.7651D-09	1.3832D-08
1.2679D-08	-1.7562D-08	1.2833D-08	-1.3312D-08	8.6750D-09	-1.4238D-08
-2.1146D-09	-3.3307D-09	3.8540D-09	6.6815D-10	-1.5511D-09	2.1888D-09
-1.0078D-07	-6.8087D-08	4.0972D-08	-2.4665D-08	4.4275D-08	8.7334D-08
-1.7263D-08	-7.6205D-08	6.8211D-08	8.0309D-08	-6.7557D-08	-2.7500D-08
-1.0225D-07	-4.8393D-08	2.4921D-08	-2.8918D-08	4.5424D-08	9.4961D-08
-1.5868D-08	-4.5743D-08	4.2982D-08	8.3377D-08	-7.3889D-08	-1.7174D-08
3.2058D-08	-1.7259D-08	5.4678D-08	9.2416D-08	-7.7467D-08	-6.3672D-08
7.6894D-08	8.7298D-08	-7.7275D-08	-2.1565D-08	8.0180D-11	-6.5947D-08
3.9234D-08	-3.3958D-08	6.0383D-08	5.9233D-08	-4.9071D-08	-6.3384D-08
3.0197D-08	8.9088D-08	-7.9528D-08	-1.9877D-08	-8.1376D-10	-7.0135D-08
4.3014D-08	7.9650D-08	-7.6347D-08	-7.0843D-08	4.0153D-08	-3.0490D-08
-6.2722D-08	-1.0887D-08	-9.7036D-09	-6.3657D-08	9.9367D-08	8.8529D-08
2.9904D-08	8.6262D-08	-8.4403D-08	-6.5124D-08	4.1460D-08	-1.5795D-08
-3.8528D-08	-1.3693D-08	-3.1789D-09	-7.6640D-08	1.0081D-07	5.9352D-08
1.5392D-08	2.1648D-08	-1.6543D-08	9.5121D-09	-1.2585D-08	-1.4914D-08
1.9722D-08	1.6392D-08	-1.5888D-08	-1.3019D-08	7.2400D-09	-1.6722D-08
-1.1646D-08	-1.5660D-08	1.6167D-08	2.0274D-08	-1.4880D-08	8.0130D-09
8.4757D-09	-1.9244D-08	2.1024D-08	1.5151D-08	-1.5288D-08	-1.4662D-08
-1.5445D-08	1.0482D-08	-1.2872D-08	-1.4682D-08	1.5784D-08	2.1175D-08
-1.5564D-08	-1.4676D-08	9.1826D-09	-1.7700D-08	2.0163D-08	1.6052D-08
-2.1724D-04	2.1573D-04	-5.1995D-04	1.3043D-03	-1.3101D-03	5.3018D-04
-2.0018D-04	-2.0436D-04	6.2190D-04	1.3195D-04	1.1793D-04	6.1330D-04
-7.5884D-05	-7.9480D-05	7.1848D-04	8.2095D-04	7.4351D-04	7.0408D-04
-2.1724D-04	2.1573D-04	-5.1995D-04	1.3043D-03	-1.3101D-03	5.3018D-04
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5.5117D-04	-7.8873D-04	2.7842D-04	8.2747D-05	-2.8344D-04	-7.5794D-04
-1.1960D-03	1.6137D-04	-9.6694D-05	2.9042D-04	-7.6652D-04	1.0742D-03
7.4469D-04	6.9957D-04	-7.1165D-05	-8.6210D-05	7.2296D-04	8.1469D-04
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-1.1960D-03	1.6137D-04	-9.6694D-05	2.9042D-04	-7.6652D-04	1.0742D-03
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7.9949D-04	-5.5021D-04	7.5908D-04	2.6547D-04	-6.5605D-05	-2.8604D-04
1.4800D-04	-1.2020D-03	1.0812D-03	-7.6835D-04	2.9303D-04	-8.9771D-05
7.1831D-04	8.1799D-04	7.4182D-04	7.0323D-04	-7.5938D-05	-8.0257D-05
7.9949D-04	-5.5021D-04	7.5908D-04	2.6547D-04	-6.5605D-05	-2.8604D-04
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7.1831D-04	8.1799D-04	7.4182D-04	7.0323D-04	-7.5938D-05	-8.0257D-05
8.4418D-05	1.9306D-04	2.3149D-03	-1.2541D-04	1.8886D-04	1.4091D-04
1.0350D-04	1.1594D-04	-1.4859D-03	2.7436D-03	1.0500D-04	2.7664D-05
-7.6211D-05	-2.2519D-05	1.2548D-03	-3.6931D-03	2.3946D-05	2.8101D-04

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-2.9259D-04	-3.0655D-04	-1.4785D-04	3.3645D-04	3.6420D-04	-1.5942D-04
1.9613D-04	2.0655D-04	7.4633D-05	-9.9372D-04	-1.0209D-03	8.1437D-05
9.5940D-05	-9.9423D-05	-3.0809D-04	1.7069D-03	-1.7082D-03	3.1329D-04
-1.8587D-04	-9.0788D-05	-1.3635D-04	-1.9553D-04	1.3031D-04	-2.3199D-03
1.1288D-04	1.0519D-04	2.7035D-05	1.0576D-04	2.7545D-03	-1.4826D-03
-2.0785D-05	-7.7661D-05	2.8138D-04	3.5094D-05	-3.7095D-03	1.2539D-03
1.4626D-05	2.7959D-04	7.0876D-05	-1.4365D-05	-6.8808D-04	-3.5401D-03
1.6894D-04	-1.5147D-05	1.8900D-04	3.2980D-04	2.9236D-04	-7.7536D-04
-1.0037D-03	3.5137D-04	2.6190D-04	3.1638D-05	-1.9952D-04	6.5256D-04
1.9949D-03	-3.1695D-04	-1.8217D-04	-8.3118D-06	2.2887D-04	-9.8301D-04
-1.4975D-05	-9.1186D-05	1.2874D-04	2.2310D-04	2.2817D-04	-1.7278D-03
-2.4402D-03	2.4419D-03	-1.2810D-06	-4.8479D-05	4.7783D-05	3.0990D-07
-1.2658D-03	-1.2570D-03	-2.1841D-04	-1.2864D-04	-1.2853D-04	-2.2147D-04
2.4421D-03	2.4314D-03	-3.8298D-06	-2.0343D-04	-2.0606D-04	-3.4216D-06
-2.8391D-03	2.8409D-03	-1.7785D-05	-2.1164D-04	2.1148D-04	2.3420D-05
2.6909D-05	-1.8518D-04	7.9375D-04	-2.9378D-04	-3.2062D-04	-1.9641D-04
3.5226D-04	-9.9278D-04	6.4525D-04	-1.9171D-04	2.9907D-05	2.6935D-04
-3.1187D-04	1.9842D-03	-9.7794D-04	2.3084D-04	-1.5494D-05	-1.9065D-04
9.1228D-05	2.9770D-06	1.7450D-03	-2.2637D-04	-2.1597D-04	-1.2745D-04
-3.7504D-05	3.4796D-05	-1.5363D-04	-1.9148D-04	1.8563D-04	1.5267D-04
7.3339D-05	3.1708D-04	-2.5223D-04	5.2416D-05	-1.8906D-04	-1.0683D-05
1.0837D-04	2.3378D-04	-1.9234D-04	-6.1923D-04	-2.8035D-04	7.8300D-05
-4.9126D-04	-4.3328D-05	2.3675D-04	-9.5341D-05	-1.2911D-04	-3.5099D-04
-2.0729D-04	2.0459D-04	-2.0785D-04	2.0628D-04	-2.0435D-04	2.0617D-04
6.6025D-04	-6.2342D-04	-1.2303D-03	-5.4957D-04	5.4740D-04	1.1945D-03
1.0576D-03	9.9055D-04	6.2290D-05	-1.0461D-03	-1.0802D-03	1.5983D-05
-1.4665D-05	-8.3567D-05	-1.1140D-04	2.1096D-04	1.8923D-04	-1.9107D-04
1.9289D-04	-2.5199D-04	-9.8073D-05	4.0665D-05	-4.5191D-05	1.6117D-04
6.6524D-04	-6.4458D-04	-1.1854D-03	-6.0972D-04	6.0994D-04	1.1618D-03
9.6624D-04	1.1181D-03	-6.4943D-05	-9.2930D-04	-1.1549D-03	6.8125D-05
6.9068D-04	-6.3582D-04	-1.1701D-03	-6.5230D-04	6.4910D-04	1.1148D-03
1.1004D-03	9.7875D-04	9.4839D-05	-1.1312D-03	-9.8893D-04	-5.5911D-05
5.3445D-04	-5.1411D-04	-1.3035D-03	-5.1251D-04	4.9602D-04	1.3011D-03
1.0578D-03	9.9276D-04	4.7592D-05	-1.0380D-03	-1.0604D-03	-1.1766D-07
-1.7807D-03	-1.0950D-03	-1.4122D-04	2.0571D-03	-1.2632D-03	2.6194D-03
-2.9029D-03	-3.5988D-04	1.0220D-03	2.8353D-03	-3.2980D-03	2.5457D-03
-1.3167D-03	-5.4828D-04	5.8152D-04	-1.4568D-03	9.5405D-04	1.7685D-03
1.1085D-03	-6.9633D-04	6.0014D-04	5.4050D-04	-1.2377D-03	-2.8192D-04
3.4912D-03	-3.5025D-03	3.3906D-03	9.4331D-04	-8.5843D-04	-3.4700D-03
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6.0083D-04	-6.3373D-04	-2.6523D-04	8.0538D-04	-7.5626D-04	2.6305D-04
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-4.1816D-04	-3.2171D-03	2.7467D-03	-3.4947D-03	2.9693D-03	1.1576D-03
2.1052D-04	1.1803D-03	-1.5461D-03	-1.1137D-03	1.5996D-03	-3.1228D-04
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-8.7092D-04	-7.3243D-03	5.7812D-04	2.6805D-04	3.8029D-04	2.6601D-04
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3.7761D-04	2.6809D-04	-8.7970D-04	-7.3031D-03	5.6736D-04	2.7398D-04
2.6879D-04	3.8029D-04	2.7165D-04	5.6738D-04	-7.3430D-03	-8.7963D-04
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Columns 1 thru 6

-8.8196D-08	-1.2469D-07	2.9266D-08	-1.5312D-08	-8.1646D-10	1.6617D-08
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5.9421D-11	2.5748D-08	-8.7327D-10	3.2768D-09	4.5507D-08	3.1478D-09
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-1.3367D-07	-5.8985D-08	-2.4462D-08	-2.3518D-08	1.2584D-08	-1.4546D-08
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1.0429D-07	7.1621D-08	3.8157D-08	-5.3413D-09	1.0432D-08	3.9688D-08
1.3644D-07	1.5235D-07	-2.1090D-08	-1.5561D-08	1.1631D-08	-2.2253D-08
1.2259D-07	-7.8845D-08	3.6150D-07	-3.7660D-08	-3.7487D-08	3.2858D-07
1.0429D-07	7.1621D-08	3.8157D-08	-5.3413D-09	1.0432D-08	3.9688D-08
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1.2259D-07	-7.8845D-08	3.6150D-07	-3.7660D-08	-3.7487D-08	3.2858D-07
-1.3748D-07	-5.3788D-08	-6.8930D-08	4.4819D-08	5.4629D-09	-5.3499D-08
7.0478D-08	2.6595D-09	4.3103D-08	2.5597D-08	-6.3407D-08	3.5574D-08
3.9219D-11	7.4379D-08	-4.3979D-08	-2.2837D-08	5.8645D-08	-3.5707D-08
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1.9570D-09	1.0193D-07	-3.7193D-08	-3.6575D-08	5.9712D-08	-2.3201D-08
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-1.0551D-07	-8.9440D-09	-4.0087D-08	8.0425D-08	3.6219D-09	-2.1087D-08
3.4551D-08	8.5808D-08	-7.1047D-08	5.7795D-08	-2.8355D-10	-5.7826D-08
-1.9446D-09	-9.5529D-08	3.7031D-08	2.8469D-08	-5.1664D-08	2.6928D-08
2.2235D-09	1.1270D-07	-3.5008D-08	-2.3885D-08	4.6100D-08	-2.1950D-08
-6.2930D-08	1.6231D-08	-7.1219D-08	5.5092D-08	-2.1794D-10	-5.5033D-08
-3.0775D-08	6.7437D-09	-9.1433D-08	2.9817D-08	-8.3108D-09	-8.1599D-08
2.6365D-08	-3.8314D-08	5.2477D-08	2.6402D-08	-3.8447D-08	4.6406D-08
6.3949D-08	1.3448D-07	-5.2336D-08	-1.6713D-08	2.6624D-08	-4.6285D-08
-1.0415D-07	-3.5908D-08	-9.1524D-08	2.1778D-08	-3.8219D-09	-8.0844D-08
-8.5328D-08	1.9272D-09	-6.7651D-08	5.0325D-08	5.0999D-10	-5.0970D-08
2.7013D-08	-6.0182D-08	3.8739D-08	2.9647D-08	-5.8536D-08	2.8690D-08

-3.6061D-09	1.0489D-07	-3.6890D-08	-2.6597D-08	5.2280D-08	-2.4664D-08
-1.0605D-07	6.6803D-09	-6.5047D-08	4.6069D-08	1.2387D-09	-4.4498D-08
4.8291D-08	4.1632D-08	4.6728D-11	1.9807D-11	2.8343D-12	-8.9519D-11
4.5923D-07	2.0693D-07	1.7029D-07	-1.2646D-07	-2.2769D-09	1.2808D-07
-4.1044D-07	-1.4852D-07	-9.7128D-08	-7.4667D-08	1.4736D-07	-7.0825D-08
7.5962D-09	2.4938D-07	-2.1110D-07	-1.8234D-07	3.6094D-07	-1.7845D-07
-2.5210D-07	6.2278D-09	-3.6739D-07	3.1285D-07	1.2548D-09	-3.1380D-07
-7.4427D-07	-8.3151D-07	1.7086D-07	-1.2834D-07	-1.4712D-09	1.3207D-07
1.6532D-06	1.6327D-06	-9.9237D-08	-7.1238D-08	1.4348D-07	-7.8843D-08
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-1.6590D-06	-1.2192D-06	-1.0286D-07	-7.4303D-08	1.5195D-07	-7.2094D-08
2.1335D-06	1.6532D-06	1.7032D-07	-1.3048D-07	9.8648D-10	1.2259D-07
1.1948D-08	2.1334D-07	-9.5020D-08	-7.4803D-08	1.4697D-07	-7.0329D-08
-2.3073D-07	-4.0144D-07	4.8720D-09	-2.2403D-07	-2.7699D-08	-3.5920D-08
-7.6004D-07	-5.0939D-07	-1.8845D-09	-9.4480D-08	2.3617D-07	2.6889D-08
-7.5128D-07	-1.0619D-06	5.4763D-07	-5.1873D-07	-1.1168D-08	4.2739D-07
-2.1563D-06	-1.4101D-06	-3.2796D-07	-2.9019D-07	6.0316D-07	-2.4822D-07
8.5938D-07	6.9102D-07	2.0707D-07	-1.8987D-07	-4.3554D-09	1.9277D-07
5.2818D-10	2.0624D-07	-1.7983D-07	-1.4194D-07	-4.4703D-08	-1.4670D-07
2.8623D-06	2.1171D-06	6.0407D-07	-5.1460D-07	4.8367D-09	5.0646D-07
3.2350D-08	4.8450D-07	-3.6612D-07	-3.1087D-07	4.9449D-07	-3.0367D-07
-2.4350D-07	-2.8667D-07	2.5577D-07	4.0344D-08	3.0506D-08	2.1863D-07
7.5330D-07	6.8868D-07	-8.4293D-08	1.9309D-08	2.4088D-07	-9.4702D-08
-7.8574D-07	-1.0559D-06	6.3107D-07	-4.3136D-07	8.6514D-09	5.2945D-07
2.1280D-06	2.2311D-06	-3.3925D-07	-2.4111D-07	5.9335D-07	-2.9398D-07
-8.4959D-08	-2.3556D-07	-3.9118D-08	1.3581D-07	-1.5377D-07	-5.2674D-08
7.6442D-08	-2.9253D-07	1.8830D-07	-5.0176D-08	-1.5337D-07	1.3298D-07
3.1677D-07	5.5976D-08	1.9088D-07	-1.5378D-07	-5.2370D-08	1.3604D-07
1.4650D-07	1.9717D-07	-3.8552D-08	-1.5329D-07	1.3326D-07	-4.9862D-08
-1.4021D-07	2.5873D-07	-2.2167D-07	-5.2507D-08	1.3623D-07	-1.5378D-07
-3.1590D-07	1.5739D-08	-2.2040D-07	1.3288D-07	-4.9891D-08	-1.5340D-07
1.0000D-08	4.7743D-09	-6.2016D-09	6.5617D-09	4.3654D-10	-6.5255D-09
1.2423D-09	1.0909D-10	-7.9349D-10	-6.1773D-10	1.5231D-09	-8.5592D-10
3.8725D-09	1.9826D-09	-3.4243D-09	-1.9681D-09	5.7029D-09	-3.7063D-09
1.0000D-08	4.7743D-09	-6.2016D-09	6.5617D-09	4.3654D-10	-6.5255D-09
1.2423D-09	1.0909D-10	-7.9349D-10	-6.1773D-10	1.5231D-09	-8.5592D-10
3.8725D-09	1.9826D-09	-3.4243D-09	-1.9681D-09	5.7029D-09	-3.7063D-09
-3.3246D-09	-5.4157D-09	-2.5221D-09	-1.5479D-09	4.0329D-09	-2.6122D-09
2.0114D-09	6.6397D-09	5.6513D-09	-3.6354D-10	-5.3914D-09	5.8677D-09
1.5822D-09	1.9728D-09	-1.9193D-09	5.6304D-09	-3.6330D-09	-1.9925D-09
-3.3246D-09	-5.4157D-09	-2.5221D-09	-1.5479D-09	4.0329D-09	-2.6122D-09
2.0114D-09	6.6397D-09	5.6513D-09	-3.6354D-10	-5.3914D-09	5.8677D-09
1.5822D-09	1.9728D-09	-1.9193D-09	5.6304D-09	-3.6330D-09	-1.9925D-09
-1.7819D-09	4.8483D-10	9.5338D-10	2.6024D-09	-3.7992D-09	1.0464D-09
-3.5470D-09	-2.2011D-09	-1.1482D-09	6.1198D-09	-5.3011D-09	-1.0657D-09
1.2276D-09	2.0520D-09	5.2282D-09	-3.7627D-09	-1.8400D-09	5.4669D-09
-1.7819D-09	4.8483D-10	9.5338D-10	2.6024D-09	-3.7992D-09	1.0464D-09
-3.5470D-09	-2.2011D-09	-1.1482D-09	6.1198D-09	-5.3011D-09	-1.0657D-09
1.2276D-09	2.0520D-09	5.2282D-09	-3.7627D-09	-1.8400D-09	5.4669D-09
2.4501D-09	1.6993D-09	2.5060D-09	-6.5329D-09	4.8445D-09	2.5351D-09
-6.7615D-09	-4.5402D-09	3.9763D-09	-4.6751D-09	-1.2711D-09	4.2062D-09

-3.2022D-10	-1.7061D-09	-4.8631D-09	5.9599D-09	4.8345D-10	-5.0312D-09
-5.7350D-10	-1.6639D-09	3.8440D-09	-8.8938D-09	5.5420D-09	3.9931D-09
1.0676D-08	5.0471D-09	3.6900D-09	-4.1116D-09	-1.0818D-09	3.8300D-09
-3.0345D-09	-1.2799D-09	2.0810D-09	2.6008D-09	-5.0103D-09	2.2738D-09
3.4761D-09	6.2902D-10	-2.1101D-09	-2.2444D-09	4.7137D-09	-2.2904D-09
8.8357D-10	-5.7983D-09	3.1646D-09	-4.9676D-09	-1.7755D-09	3.4613D-09
1.7104D-09	4.4625D-09	6.6264D-09	-1.0122D-09	-5.1027D-09	6.9537D-09
5.9504D-09	4.0700D-09	-3.3400D-09	5.3513D-09	-1.5750D-10	-3.5108D-09
7.9306D-10	1.3174D-09	4.6564D-09	-5.4563D-09	-7.3067D-10	4.8221D-09
-1.8537D-09	7.8679D-10	8.7221D-09	-2.0843D-09	-6.5388D-09	9.2414D-09
-3.4323D-10	-2.1453D-09	-5.4235D-10	5.1408D-09	-3.9185D-09	-4.3689D-10
6.5569D-09	9.0882D-09	-4.1950D-09	1.1833D-09	2.3703D-09	-4.6376D-09
3.6693D-09	-2.3571D-09	4.4910D-09	1.2805D-10	-2.2386D-09	4.8794D-09
8.1090D-09	3.1277D-09	-6.5671D-11	5.5794D-09	-3.7780D-09	2.4095D-11
-5.6358D-09	-5.7795D-09	-3.5129D-09	2.0841D-09	-2.7138D-10	-3.6198D-09
2.2091D-09	-7.8536D-10	-3.3765D-09	-4.2643D-09	8.0182D-09	-3.6430D-09
-2.7232D-09	1.8218D-10	4.2635D-09	5.9611D-09	-1.0713D-08	4.6199D-09
2.4717D-09	6.3254D-10	-3.0719D-09	2.1278D-09	-2.9202D-10	-3.2472D-09
-2.3261D-09	-3.2415D-09	-3.3408D-09	6.4342D-11	4.0912D-09	-3.4619D-09
-1.4890D-09	-3.8383D-10	3.2453D-09	-4.1703D-09	1.9154D-09	3.4418D-09
-1.0571D-08	-1.1298D-08	-3.9915D-09	3.4839D-09	-2.3120D-09	-4.0740D-09
4.9684D-09	1.6515D-09	-2.5645D-09	3.8010D-10	3.9504D-09	-2.6758D-09
-3.7330D-09	3.9640D-10	1.7762D-09	-2.1149D-09	2.3473D-10	1.7958D-09
-1.9266D-09	-4.9059D-09	-1.3939D-09	-1.1259D-09	2.1815D-09	-1.4224D-09
-1.3771D-09	3.0671D-09	2.6150D-09	1.3937D-09	-4.2075D-09	2.7313D-09
-3.8574D-09	9.6967D-10	3.9103D-09	-3.4044D-09	-7.2871D-10	4.0415D-09
-3.0345D-09	-2.6395D-09	-2.2146D-10	-3.3224D-10	-1.3676D-10	-2.0295D-10
-1.7627D-09	3.8019D-09	-1.7411D-10	-4.4917D-10	1.7770D-09	-3.3020D-10
-5.8003D-09	-8.9393D-09	-2.1647D-09	3.4007D-10	7.0996D-11	-2.1753D-09
3.0325D-09	1.6122D-09	-3.6365D-09	-2.2675D-09	6.4614D-09	-3.9282D-09
1.6219D-09	1.5518D-09	-4.6318D-09	6.2306D-09	-1.1230D-09	-4.8658D-09
-1.7617D-08	-9.7927D-09	-1.3220D-09	-3.1071D-09	2.1623D-10	-1.4174D-09
1.9311D-08	1.2367D-08	-2.3810D-10	4.9999D-09	2.3677D-09	-3.1355D-10
-1.5119D-08	-8.5480D-09	-1.7430D-09	-3.6255D-09	1.5172D-09	-1.8835D-09
-2.1381D-08	-2.3035D-08	-3.5355D-09	-3.6054D-09	-4.0322D-11	-3.5075D-09
1.8235D-08	2.0834D-08	3.1395D-09	2.2455D-09	2.8437D-09	3.0246D-09
5.1929D-10	-3.2166D-09	-1.3206D-09	1.3981D-09	1.3015D-10	-1.3375D-09
1.5051D-07	1.3295D-07	5.2019D-08	3.1937D-08	-7.2771D-08	5.3999D-08
2.1462D-07	2.0555D-07	-2.2474D-08	8.4399D-08	-3.7098D-08	-2.5760D-08
1.3833D-07	1.1284D-07	5.1246D-08	2.0187D-08	-6.4415D-08	5.3312D-08
1.8145D-07	1.7439D-07	-2.4402D-08	6.4693D-08	-2.3291D-08	-2.7801D-08
-1.8583D-07	-2.0291D-07	-8.2379D-08	6.0823D-08	-1.1018D-09	-8.2917D-08
1.8248D-08	1.5534D-08	-1.4201D-08	-4.3612D-08	6.1479D-08	-1.5969D-08
-1.8173D-07	-1.8309D-07	-6.2595D-08	4.8153D-08	-4.3071D-10	-6.2546D-08
2.1006D-08	2.2395D-08	-1.4123D-08	-4.3361D-08	6.1562D-08	-1.5995D-08
1.0710D-07	5.2525D-08	6.3339D-09	-4.8701D-08	5.4954D-08	5.5989D-09
-2.4058D-07	-1.5615D-07	7.2194D-08	-3.9772D-08	-6.2800D-08	7.8517D-08
9.4109D-08	5.0674D-08	1.3054D-08	-5.1041D-08	4.5327D-08	1.2695D-08
-2.1183D-07	-1.5208D-07	5.9950D-08	-3.5977D-08	-4.5816D-08	6.5708D-08
2.5741D-09	1.3114D-09	-9.6641D-09	-4.9000D-09	1.3324D-08	-1.0385D-08
3.7262D-09	4.2259D-09	5.2580D-11	-1.1540D-08	1.3886D-08	-1.6031D-10

-7.2513D-09	-2.1665D-09	-4.4091D-09	1.2717D-08	-1.0318D-08	-4.5520D-09
-2.8199D-09	-1.2933D-09	-1.1323D-08	1.4462D-08	-2.8205D-10	-1.1837D-08
-2.0489D-11	-3.4957D-09	1.2189D-08	-1.0964D-08	-4.2514D-09	1.2884D-08
1.1196D-09	-7.8549D-10	1.2926D-08	4.7521D-10	-1.2320D-08	1.3850D-08
-1.1407D-04	3.5165D-04	-1.4320D-04	-9.8296D-05	2.4345D-05	6.0485D-05
-7.5137D-06	-2.3339D-04	-1.6205D-06	-1.3829D-04	-1.0098D-03	-1.2936D-04
-4.5276D-05	-2.8945D-04	2.7658D-04	2.6236D-04	-4.6351D-03	2.6269D-04
-1.1407D-04	3.5165D-04	-1.4320D-04	-9.8296D-05	2.4345D-05	6.0485D-05
-7.5137D-06	-2.3339D-04	-1.6205D-06	-1.3829D-04	-1.0098D-03	-1.2936D-04
-4.5276D-05	-2.8945D-04	2.7658D-04	2.6236D-04	-4.6351D-03	2.6269D-04
-4.6540D-04	-5.2411D-05	-3.6540D-05	8.6147D-04	8.3900D-05	1.7114D-04
3.1566D-04	-1.4203D-04	1.0918D-04	5.3108D-04	1.1674D-04	-2.1008D-05
3.9502D-04	1.2439D-04	2.5308D-04	-4.6191D-03	2.6236D-04	2.7114D-04
-4.6540D-04	-5.2411D-05	-3.6540D-05	8.6147D-04	8.3900D-05	1.7114D-04
3.1566D-04	-1.4203D-04	1.0918D-04	5.3108D-04	1.1674D-04	-2.1008D-05
3.9502D-04	1.2439D-04	2.5308D-04	-4.6191D-03	2.6236D-04	2.7114D-04
-4.7269D-04	-1.6762D-04	-1.0374D-05	-1.4771D-04	-6.5662D-05	-8.9023D-04
-4.1444D-04	-5.8520D-04	-3.8337D-05	9.2919D-06	1.5502D-04	4.8251D-04
-2.5402D-04	2.5382D-04	-4.4677D-03	2.7113D-04	2.6270D-04	-4.6235D-03
-4.7269D-04	-1.6762D-04	-1.0374D-05	-1.4771D-04	-6.5662D-05	-8.9023D-04
-4.1444D-04	-5.8520D-04	-3.8337D-05	9.2919D-06	1.5502D-04	4.8251D-04
-2.5402D-04	2.5382D-04	-4.4677D-03	2.7113D-04	2.6270D-04	-4.6235D-03
6.0337D-04	2.3606D-04	3.4545D-05	-1.9533D-04	1.9768D-04	1.9323D-04
-2.7784D-04	-5.0822D-05	-2.9409D-05	-1.0006D-04	6.6485D-05	1.4516D-04
1.8798D-04	-1.5276D-04	-1.7168D-04	-3.3040D-05	1.8509D-04	-2.5098D-04
5.8089D-04	1.5067D-04	-1.3528D-04	3.2457D-05	1.6532D-04	-3.8209D-05
4.7400D-04	7.2460D-05	7.0295D-05	-1.5011D-04	-1.2115D-05	1.4781D-04
-2.4953D-05	2.0437D-04	2.6329D-05	-8.0380D-05	-1.2064D-05	-1.0476D-04
2.4881D-05	-4.5079D-04	-9.7692D-05	-2.9011D-07	3.0711D-04	2.6720D-05
-1.7216D-04	-3.8341D-04	-1.4090D-04	2.0427D-04	8.7898D-07	-2.1296D-04
5.7770D-04	8.4823D-05	8.8976D-05	-1.5636D-04	-2.2372D-04	1.8373D-04
2.6543D-04	6.0233D-04	-5.8769D-05	1.3752D-04	9.3581D-05	-1.1932D-04
-1.5164D-04	-5.8902D-04	-2.3252D-05	-2.3897D-04	1.6152D-04	-6.6473D-06
5.6602D-04	5.8537D-05	-5.9021D-05	7.7566D-05	-2.0048D-04	-4.7382D-05
2.0250D-04	-8.8383D-05	-1.3948D-05	1.8843D-05	1.3322D-05	1.4754D-04
6.7163D-05	4.1836D-04	-8.7667D-05	-2.0323D-06	1.7826D-04	-9.1477D-05
3.3618D-04	-9.8322D-06	-3.9248D-05	-1.5578D-04	1.7436D-04	-1.7434D-04
6.8240D-04	2.9611D-04	-1.8243D-04	2.6661D-04	1.2649D-04	-1.0137D-04
-1.8845D-04	-3.4631D-04	2.7150D-05	2.8909D-05	1.0174D-05	-4.0156D-05
3.4476D-05	4.2310D-04	1.6029D-05	-2.3891D-04	2.1953D-04	-2.0358D-04
-2.3320D-05	-4.7604D-04	-7.3978D-05	9.1928D-05	4.5766D-05	5.2680D-05
5.2643D-05	-2.0889D-04	-2.3489D-04	2.3465D-04	1.5527D-05	-2.4418D-04
1.9248D-04	-6.5024D-06	2.0904D-04	-1.6633D-04	8.2971D-06	-5.8360D-06
-1.8414D-05	2.2452D-04	-1.1756D-04	-7.6020D-05	1.7123D-04	1.6860D-05
-3.3309D-04	-7.1623D-04	-2.4260D-04	-1.9510D-04	1.7524D-04	-1.5051D-04
6.3856D-04	1.3726D-04	-4.2580D-04	8.3974D-05	-1.0082D-04	-2.6791D-04
3.5987D-04	-1.5573D-05	6.6297D-05	-1.2311D-04	-1.1420D-05	1.3418D-04
-2.2041D-05	3.1862D-04	-2.6443D-05	-8.4960D-05	1.4634D-04	-6.7125D-05
5.7348D-05	-4.4195D-04	-1.4885D-04	-1.0622D-04	7.0198D-05	5.7901D-05
4.3380D-04	-7.7068D-05	-1.6255D-04	7.1991D-05	-8.5616D-05	3.4257D-05
-5.8705D-05	-5.4073D-05	7.6568D-08	-2.6306D-06	-3.9573D-06	-3.8175D-06

-2.0072D-03	-5.8464D-04	-3.4403D-04	2.9927D-04	3.2654D-05	-3.1971D-04
1.1647D-03	-1.1544D-04	2.0630D-04	1.8575D-04	-3.5625D-04	1.4593D-04
-2.0321D-04	-4.8182D-04	2.1941D-03	2.0807D-03	-4.0891D-03	1.9997D-03
3.9673D-04	-1.5906D-04	3.8569D-03	-3.5554D-03	-1.5523D-05	3.5691D-03
1.6708D-03	2.5506D-03	-3.7127D-04	3.2281D-04	1.5187D-05	-3.7321D-04
-4.8958D-03	-5.3283D-03	2.4155D-04	1.2443D-04	-2.8945D-04	2.5381D-04
1.5898D-03	2.3927D-03	-2.9296D-04	2.4725D-04	-3.1578D-05	-2.7605D-04
4.9459D-03	3.0531D-03	2.9480D-04	1.6704D-04	-4.4997D-04	2.0516D-04
-6.9528D-03	-4.8958D-03	-3.6767D-04	3.9504D-04	-4.5309D-05	-2.5400D-04
-1.7089D-04	-1.2219D-03	1.7660D-04	1.9546D-04	-3.4247D-04	1.3079D-04
3.2482D-03	1.9515D-03	6.5735D-03	-6.7794D-04	-1.4068D-03	5.4845D-03
3.7567D-03	4.1188D-03	-4.0257D-03	8.9904D-0[illegible]	5.3363D-04	-3.6275D-03
2.0038D-03	4.2584D-05	-3.3660D-03	2.1691D-03	-1.1475D-05	-1.3861D-03
1.0292D-03	1.9335D-03	1.7813D-03	1.2764D-03	-2.2669D-03	8.7892D-04
-4.4683D-03	-3.8469D-03	-1.2289D-04	2.0265D-04	4.0689D-04	-4.1059D-04
8.2707D-04	9.8352D-04	-6.7451D-04	-1.4804D-03	6.5904D-03	-1.0202D-03
-2.7366D-04	-1.4979D-03	-2.4001D-03	1.9920D-03	-8.6573D-05	-2.2136D-03
2.3563D-04	1.4158D-03	9.8139D-04	1.1249D-03	-1.6415D-03	1.2295D-03
3.1612D-03	1.7584D-03	1.0235D-03	-5.8689D-03	1.0924D-03	1.1810D-03
-4.2035D-03	-3.4647D-03	2.0367D-04	-2.9556D-03	1.6276D-04	9.6104D-04
2.1539D-03	7.9915D-04	-2.1449D-03	1.4495D-03	4.1863D-05	-1.9634D-03
-5.5708D-04	1.4767D-05	1.5971D-03	7.6736D-04	-2.5404D-03	1.1363D-03
5.3446D-04	9.6626D-04	3.4734D-04	7.4469D-04	-7.5830D-05	7.1827D-04
-5.1411D-04	1.1181D-03	5.5535D-04	6.9954D-04	-7.9457D-05	8.1800D-04
-1.3034D-03	-6.4906D-05	4.8919D-04	-7.1130D-05	7.1843D-04	7.4182D-04
-5.1249D-04	-9.2926D-04	3.1889D-04	-8.6149D-05	8.2096D-04	7.0320D-04
4.9602D-04	-1.1549D-03	3.7576D-04	7.2289D-04	7.4352D-04	-7.5912D-05
1.3011D-03	6.8147D-05	3.4339D-04	8.1472D-04	7.0401D-04	-8.0237D-05

Appendix C. *SPICE Modal Models Open-loop Bode Responses*

This appendix contains bode plots of the responses in the x and y LOS axis to the six disturbance inputs and 18 PMA inputs of the structure. The SPICE models implemented for this analysis are the 80-state, 12-state and 6-state modal models.

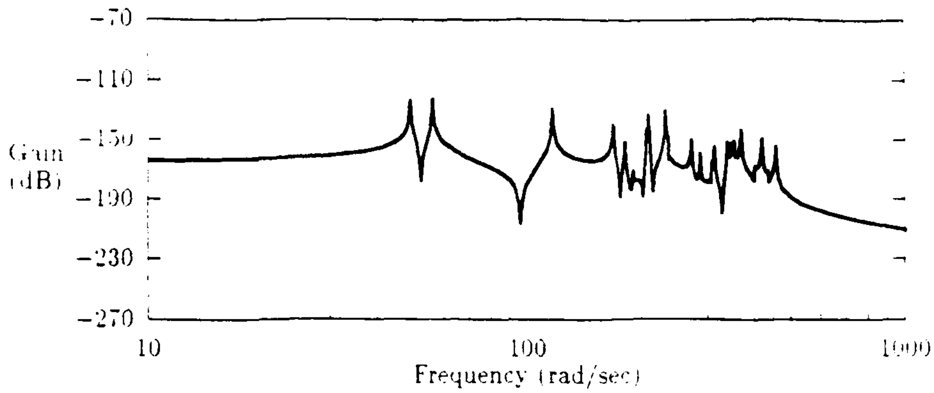

Figure C.1. Truth Model Disturbance 1 X-axis Response

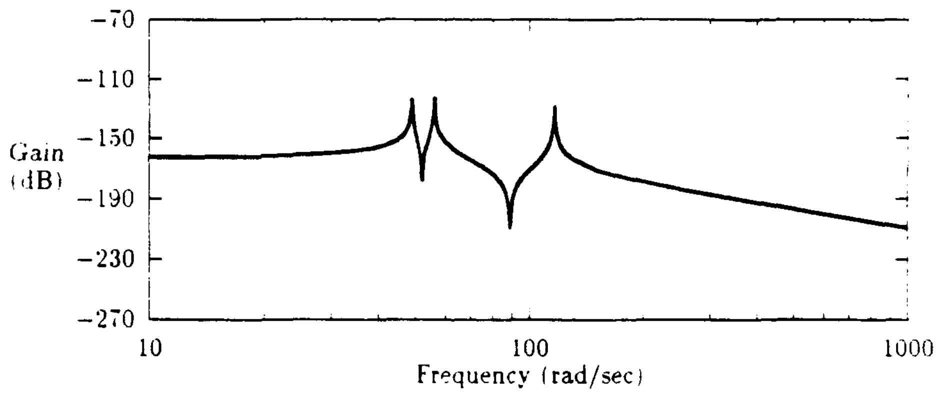

Figure C.2. 12-State Modal Reduced Disturbance 1 X-axis Response

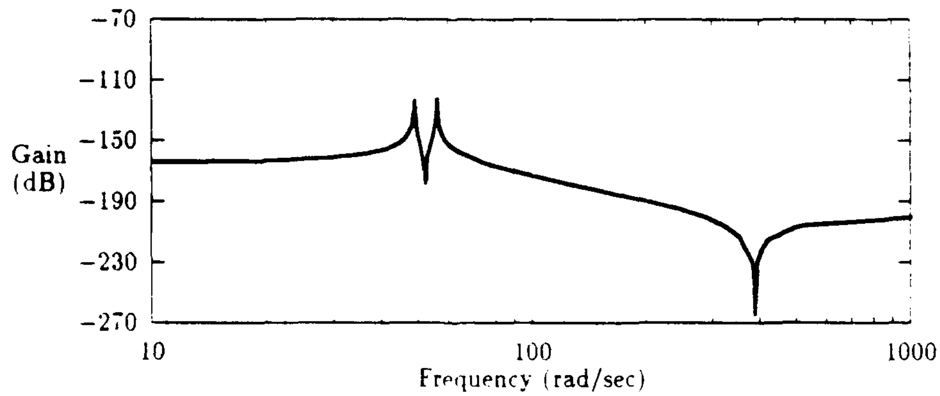

Figure C.3. 6-State Modal Reduced Disturbance 1 X-axis Response

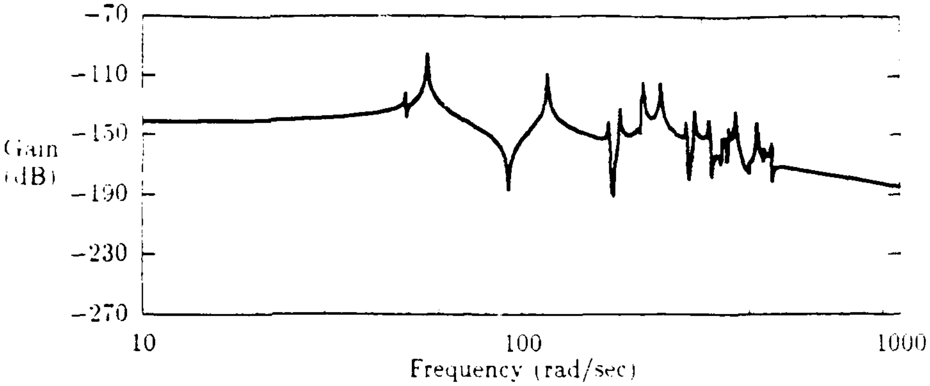

Figure C.4. Truth Model Disturbance 2 X-axis Response

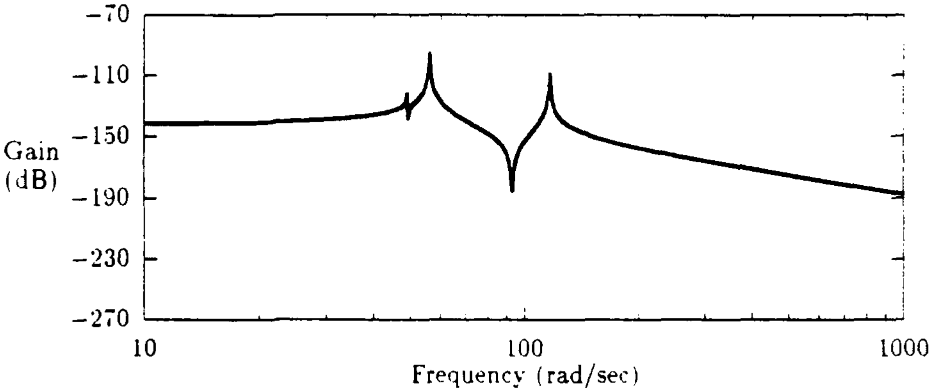

Figure C.5. 12-State Modal Reduced Disturbance 2 X-axis Response

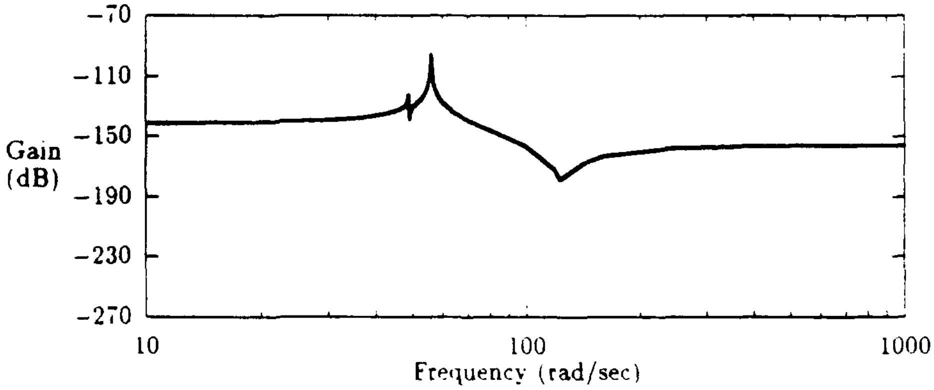

Figure C.6. 6-State Modal Reduced Disturbance 2 X-axis Response

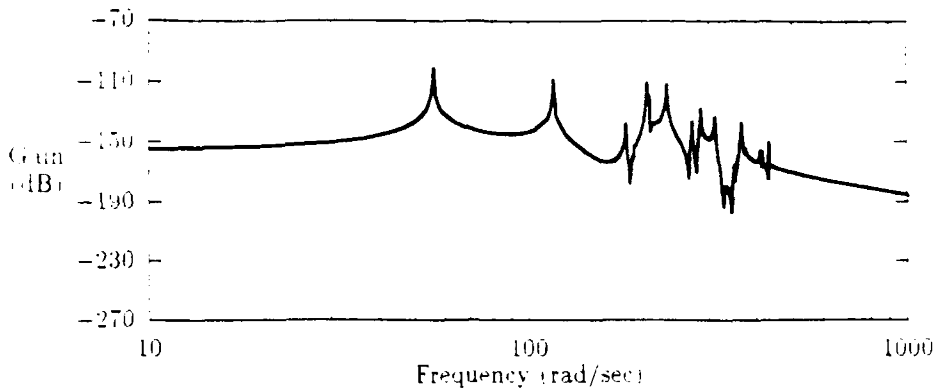

Figure C.7. Truth Model Disturbance 3 X-axis Response

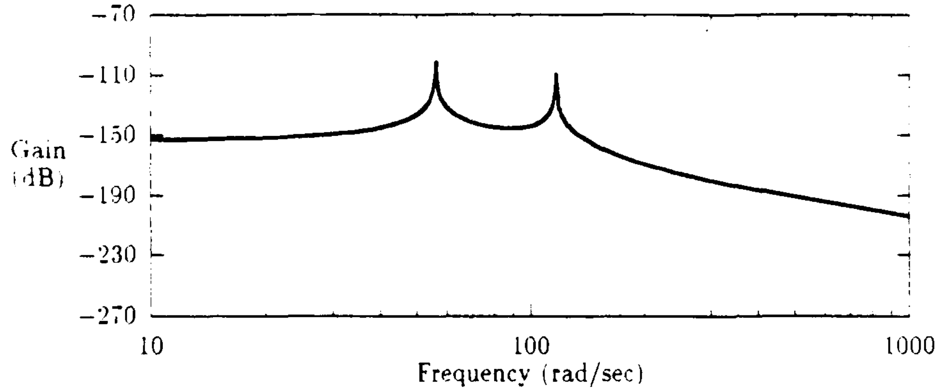

Figure C.8. 12-State Modal Reduced Disturbance 3 X-axis Response

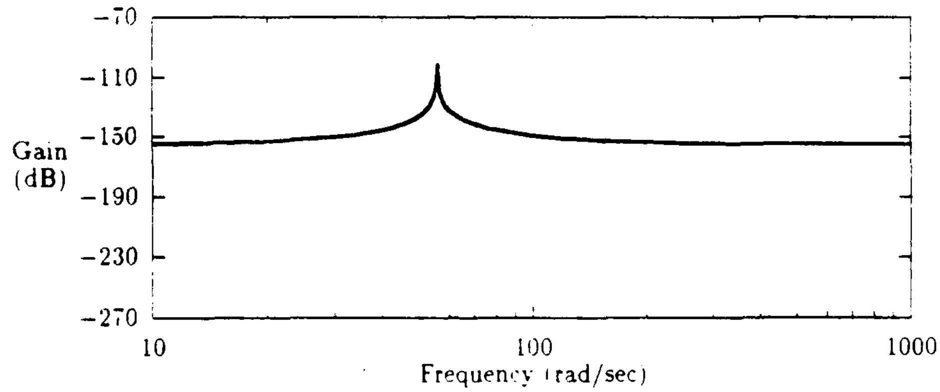

Figure C.9. 6-State Modal Reduced Disturbance 3 X-axis Response

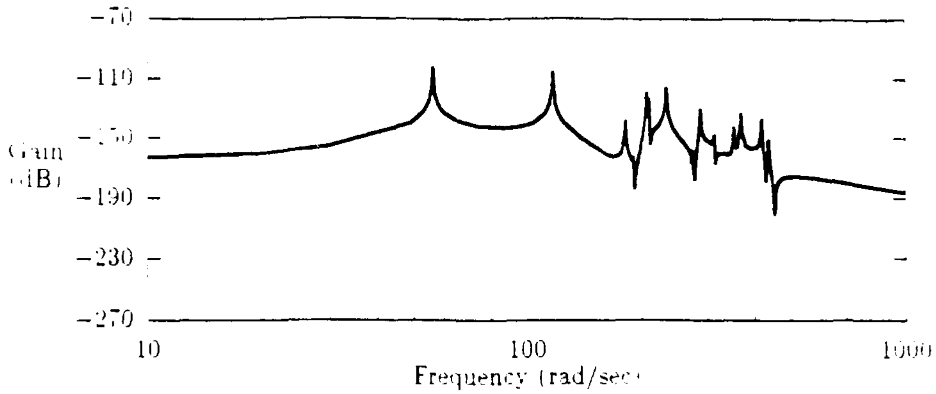

Figure C.10. Truth Model Disturbance 4 X-axis Response

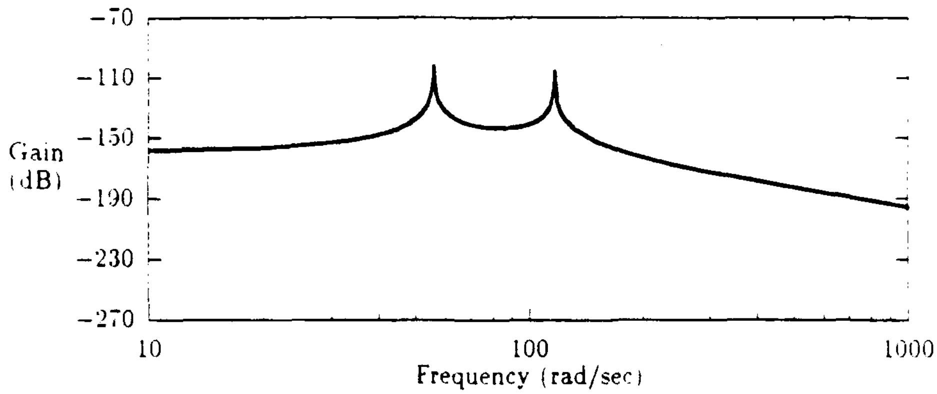

Figure C.11. 12-State Modal Reduced Disturbance 4 X-axis Response

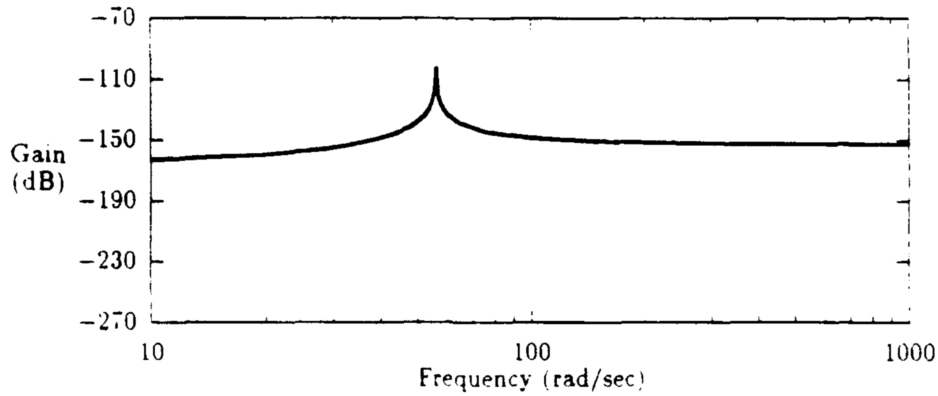

Figure C.12. 6-State Modal Reduced Disturbance 4 X-axis Response

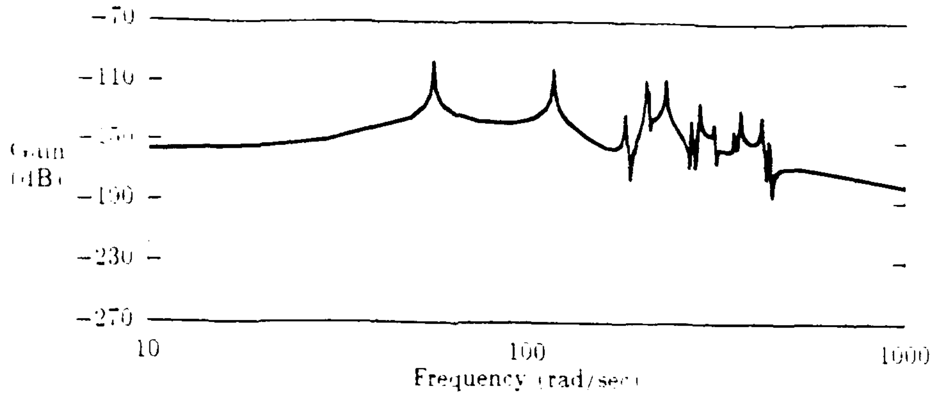

Figure C.13. Truth Model Disturbance 5 X-axis Response

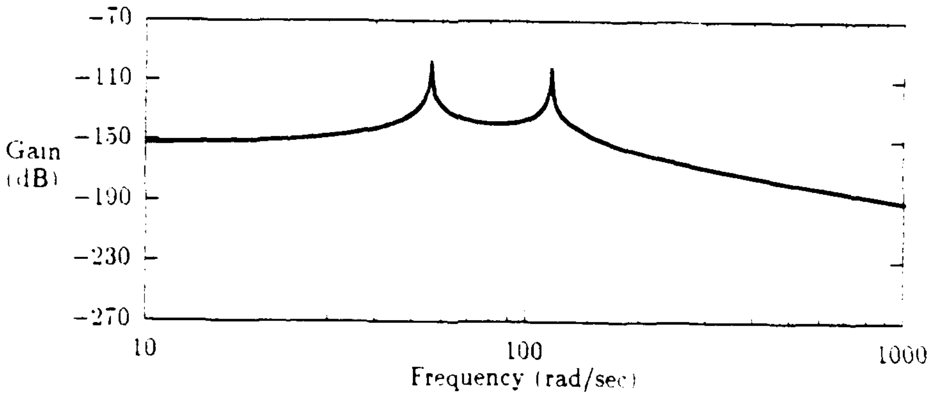

Figure C.14. 12-State Modal Reduced Disturbance 5 X-axis Response

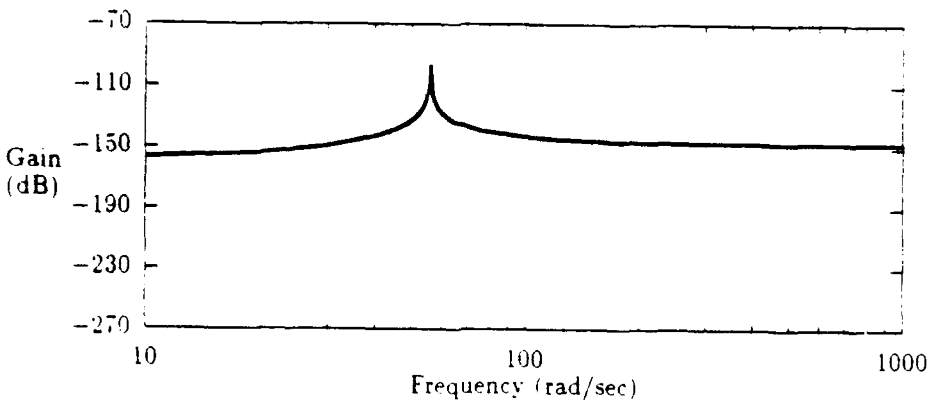

Figure C.15. 6-State Modal Reduced Disturbance 5 X-axis Response

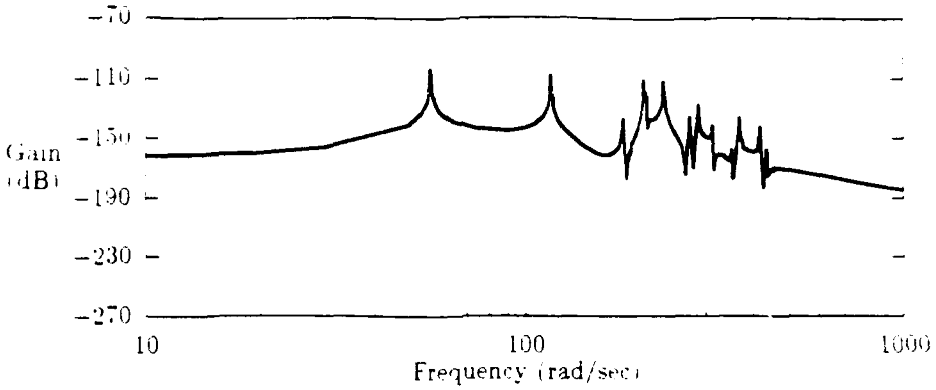

Figure C.16. Truth Model Disturbance 6 X-axis Response

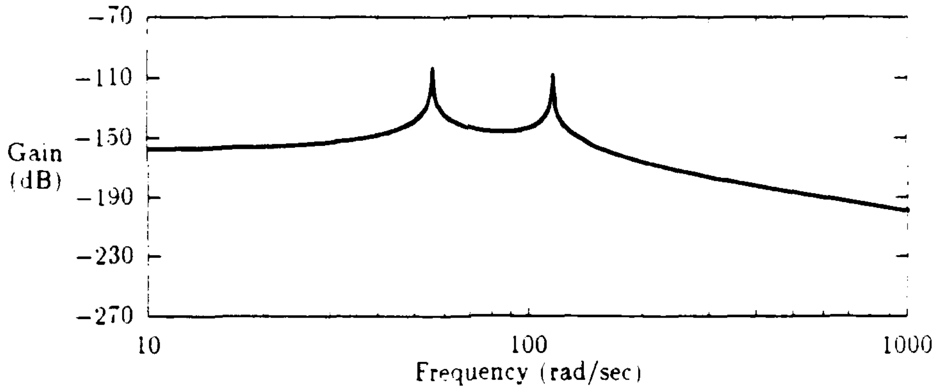

Figure C.17. 12-State Modal Reduced Disturbance 6 X-axis Response

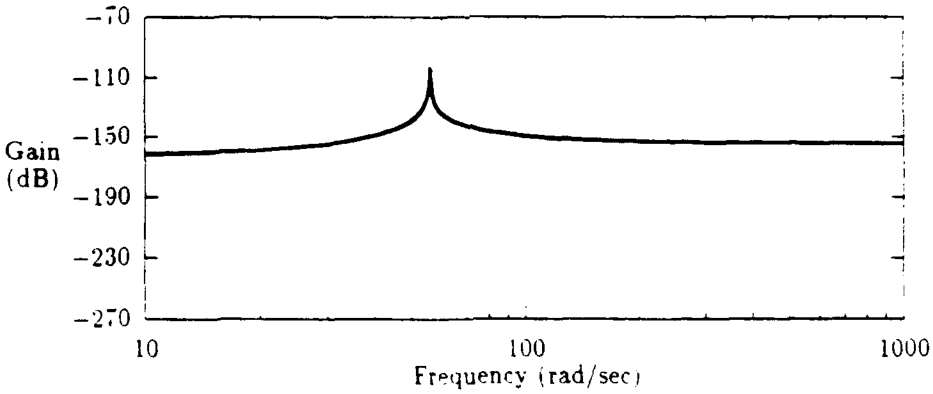

Figure C.18. 6-State Modal Reduced Disturbance 6 X-axis Response

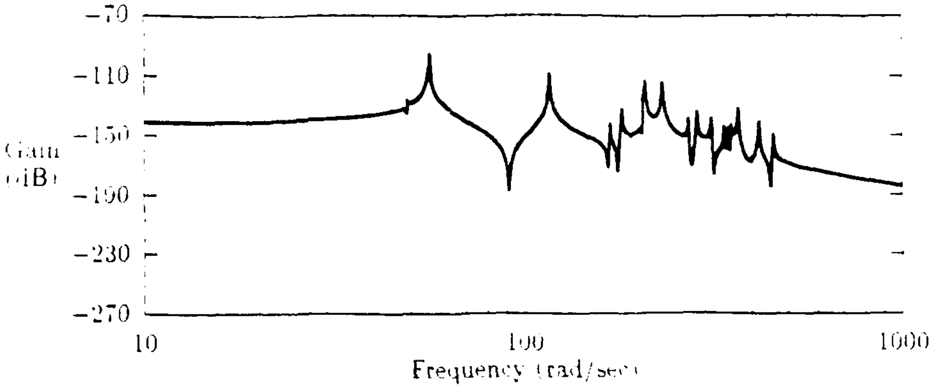

Figure C.19. Truth Model Disturbance 1 Y-axis Response

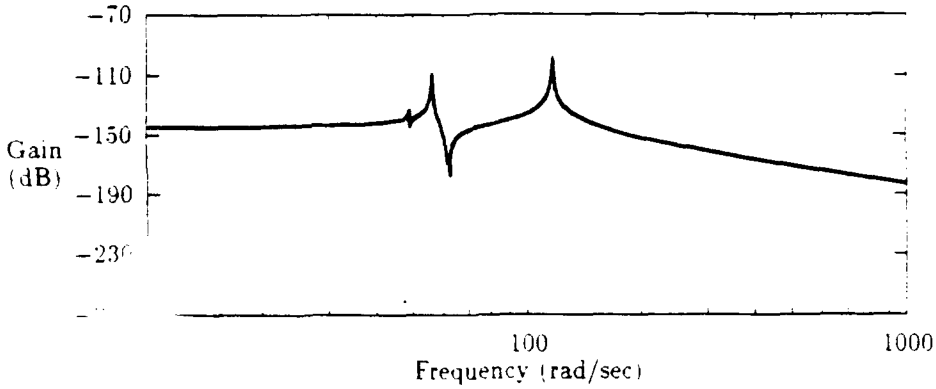

Figure C.20. 12-State Modal Reduced Disturbance 1 Y-axis Response

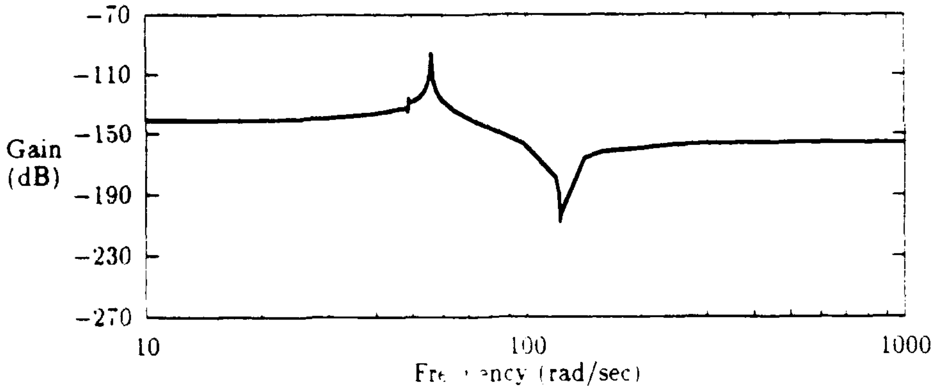

Figure C.21. 6-State Modal Reduced Disturbance 1 Y-axis Response

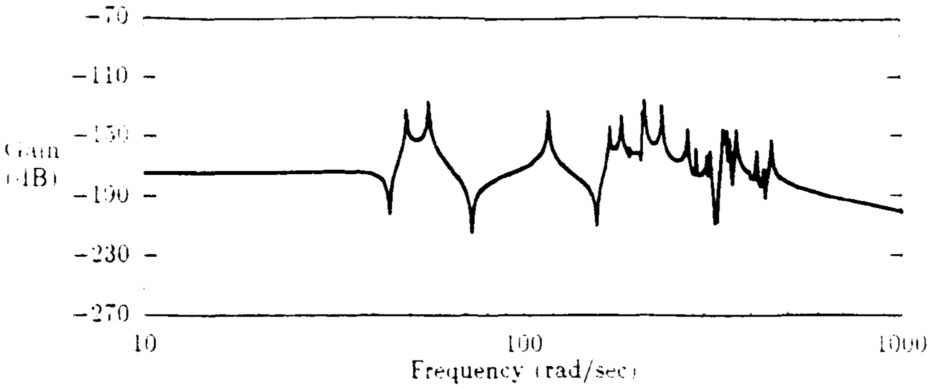

Figure C.22. Truth Model Disturbance 2 Y-axis Response

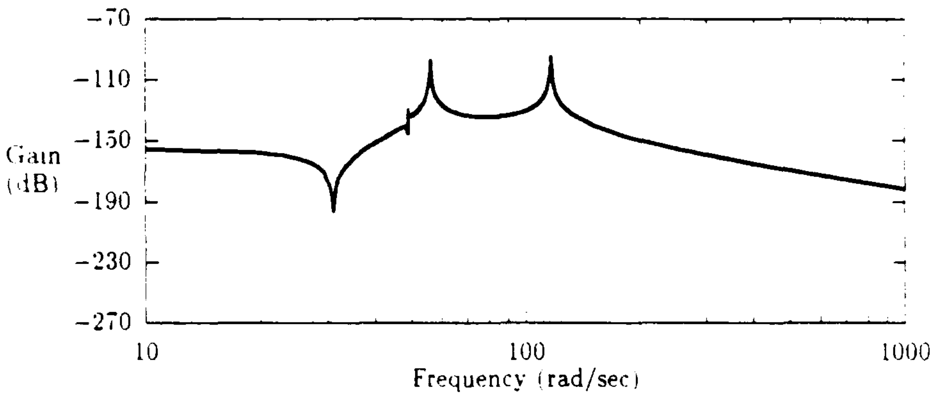

Figure C.23. 12-State Modal Reduced Disturbance 2 Y-axis Response

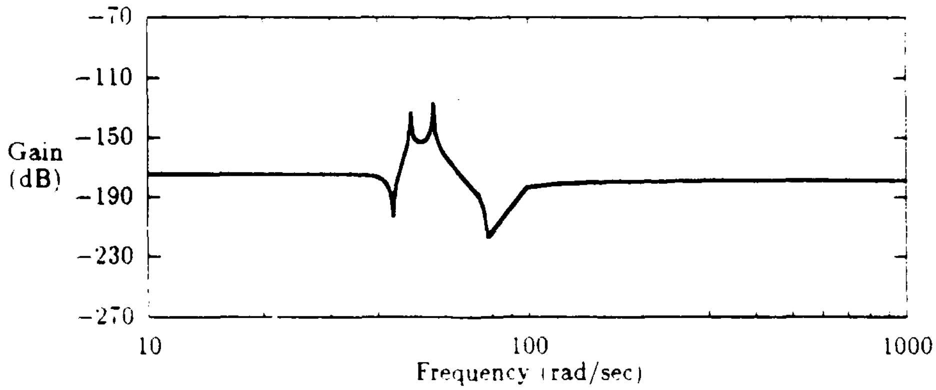

Figure C.24. 6-State Modal Reduced Disturbance 2 Y-axis Response

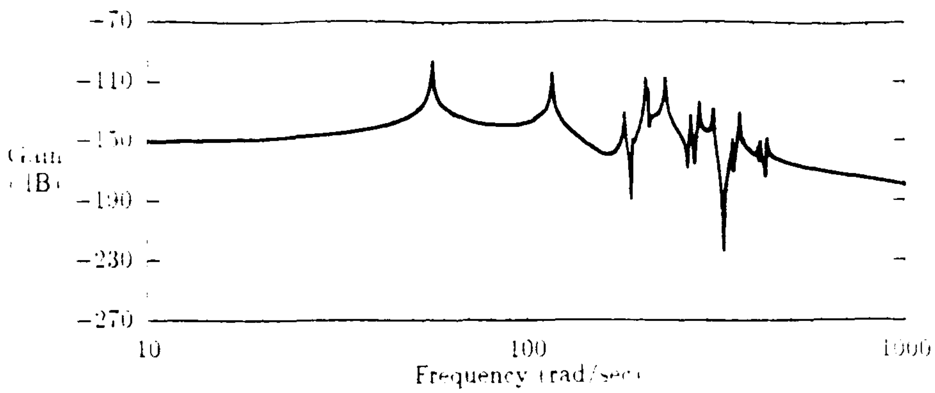

Figure C.25. Truth Model Disturbance 3 Y-axis Response

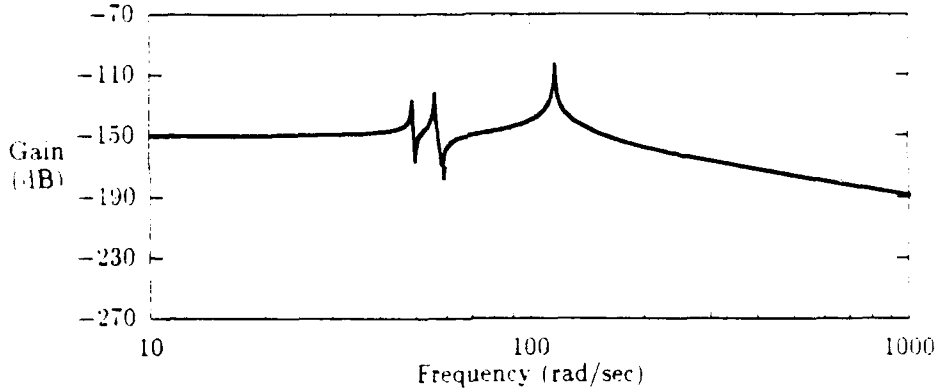

Figure C.26. 12-State Modal Reduced Disturbance 3 Y-axis Response

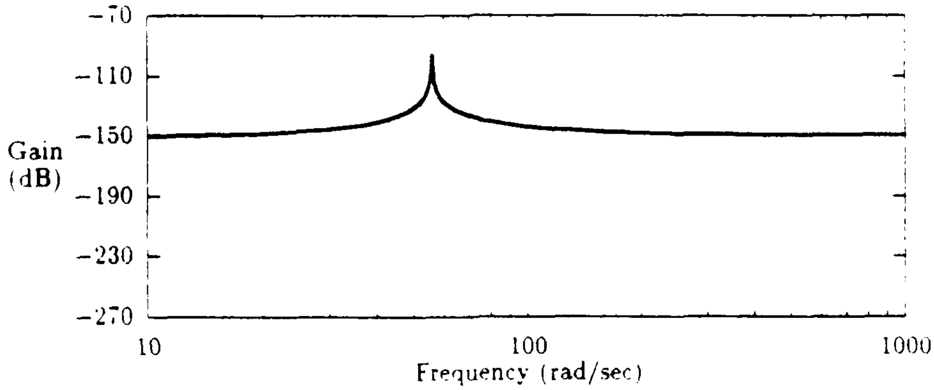

Figure C.27. 6-State Modal Reduced Disturbance 3 Y-axis Response

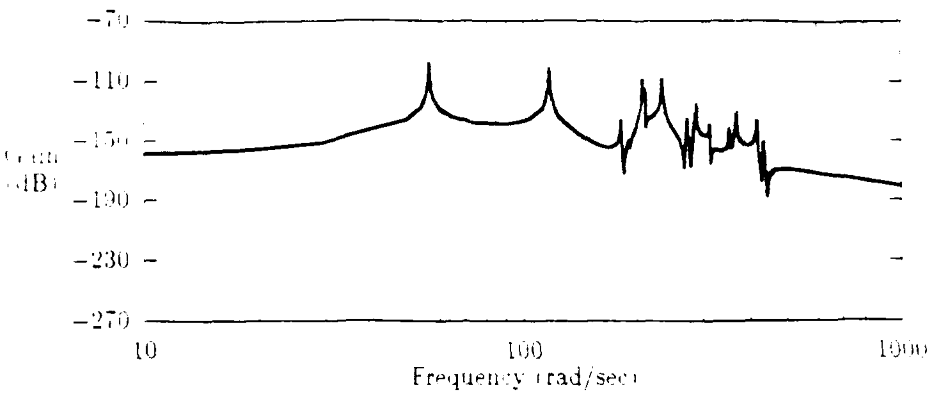

Figure C.28. Truth Model Disturbance 4 Y-axis Response

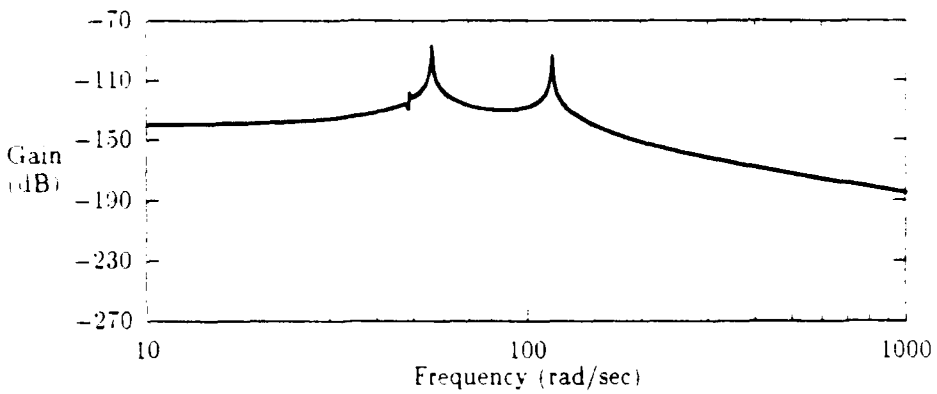

Figure C.29. 12-State Modal Reduced Disturbance 4 Y-axis Response

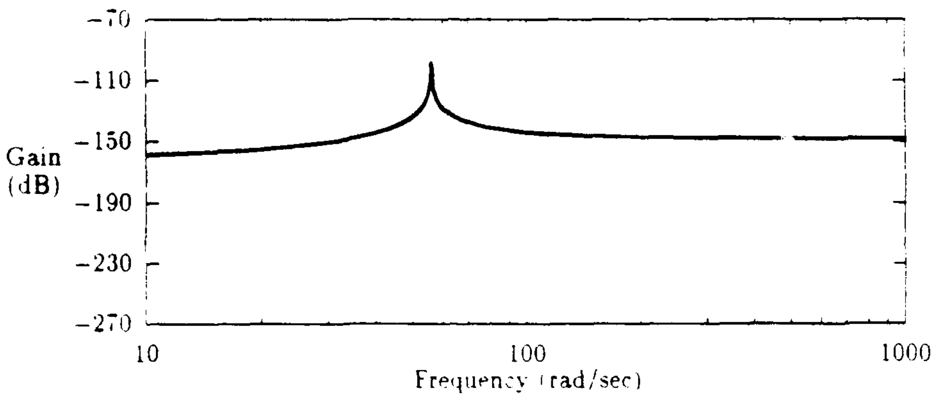

Figure C.30. 6-State Modal Reduced Disturbance 4 Y-axis Response

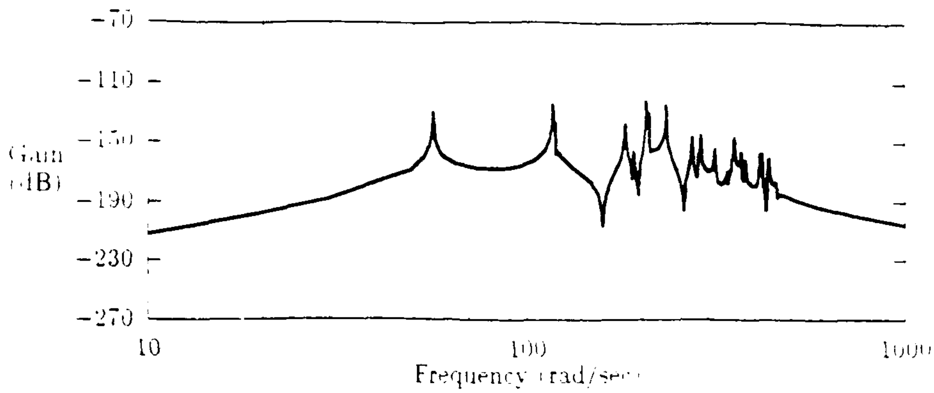

Figure C.31. Truth Model Disturbance 5 Y-axis Response

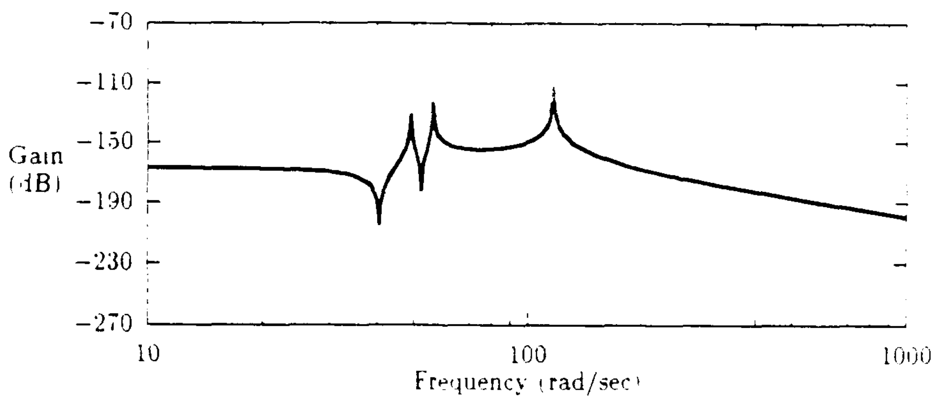

Figure C.32. 12-State Modal Reduced Disturbance 5 Y-axis Response

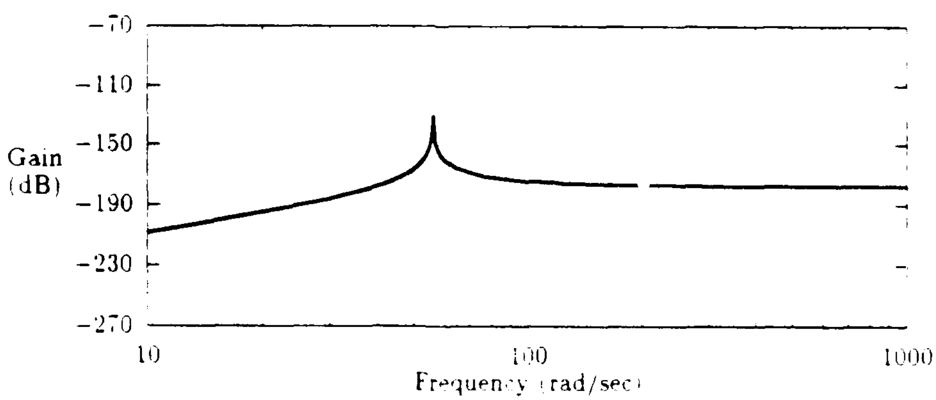

Figure C.33. 6-State Modal Reduced Disturbance 5 Y-axis Response

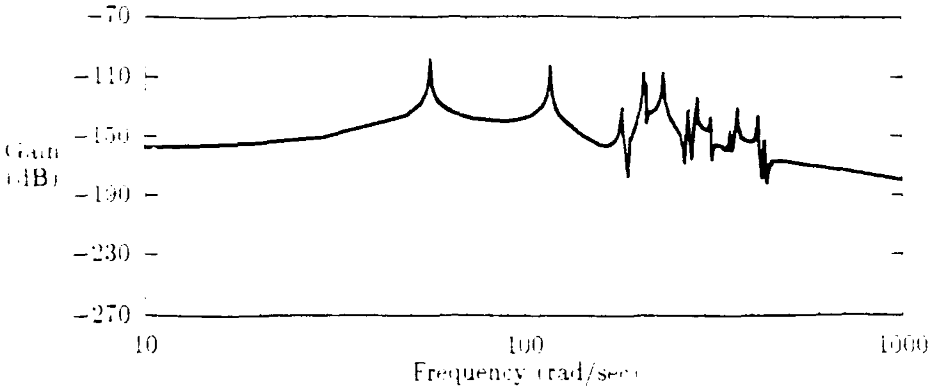

Figure C.34. Truth Model Disturbance 6 Y-axis Response

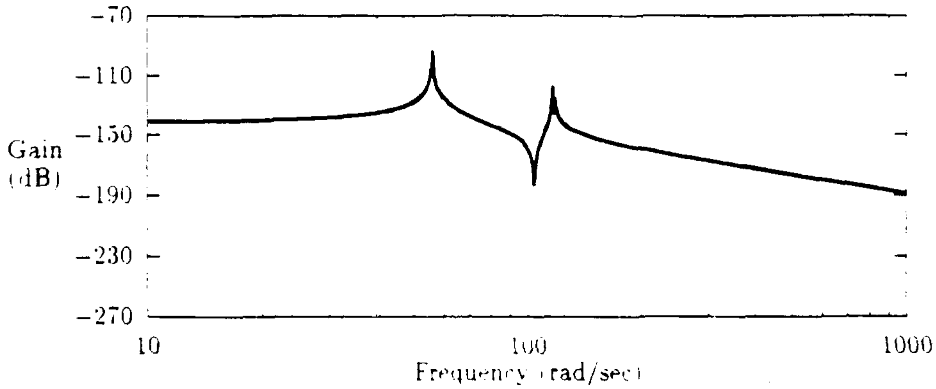

Figure C.35. 12-State Modal Reduced Disturbance 6 Y-axis Response

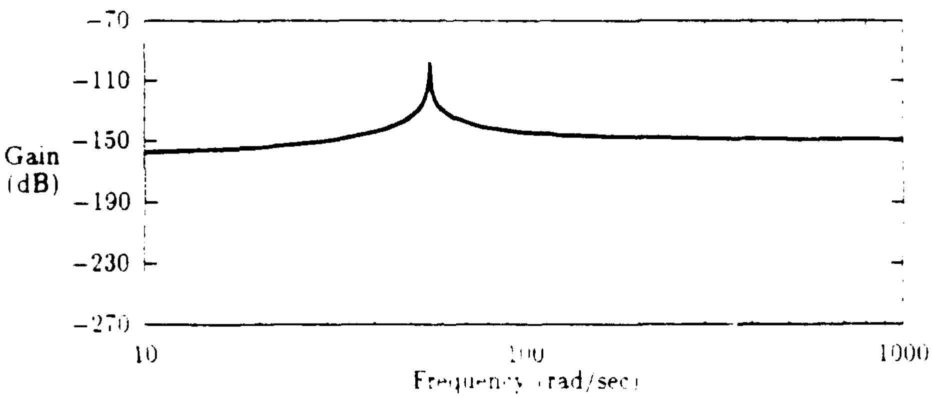

Figure C.36. 6-State Modal Reduced Disturbance 6 Y-axis Response

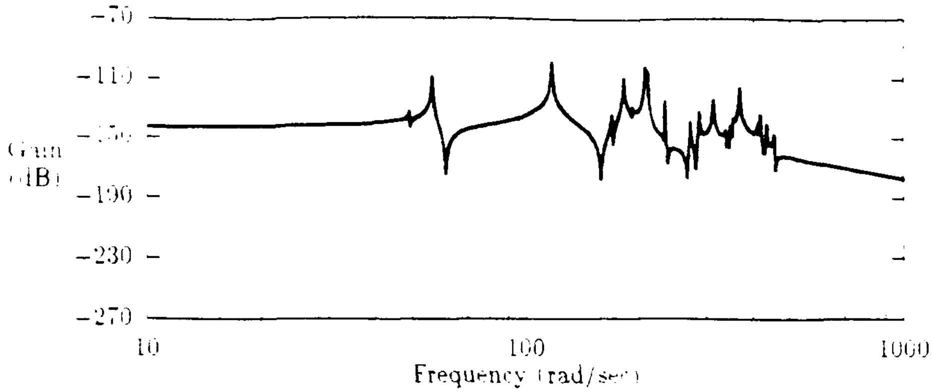

Figure C.37. Truth Model PMA 1 X-axis Response

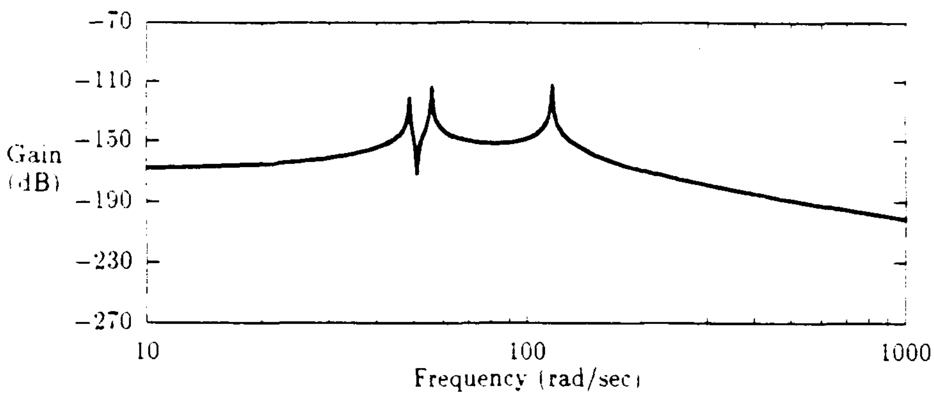

Figure C.38. 12-State Modal Reduced PMA 1 X-axis Response

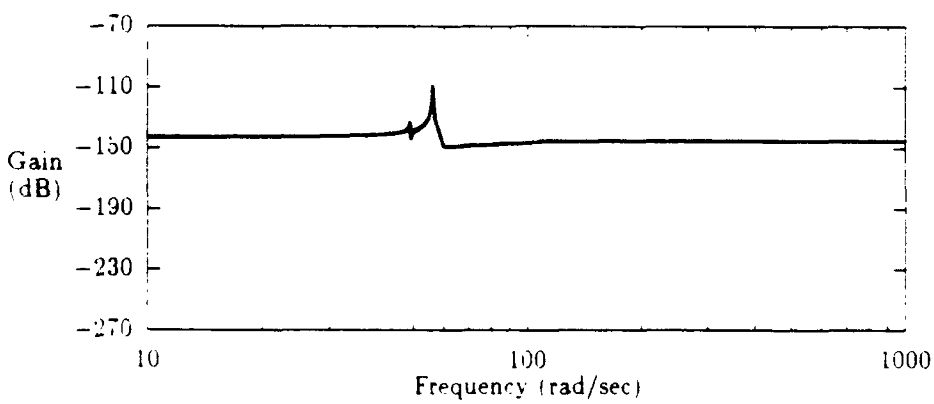

Figure C.39. 6-State Modal Reduced PMA 1 X-axis Response

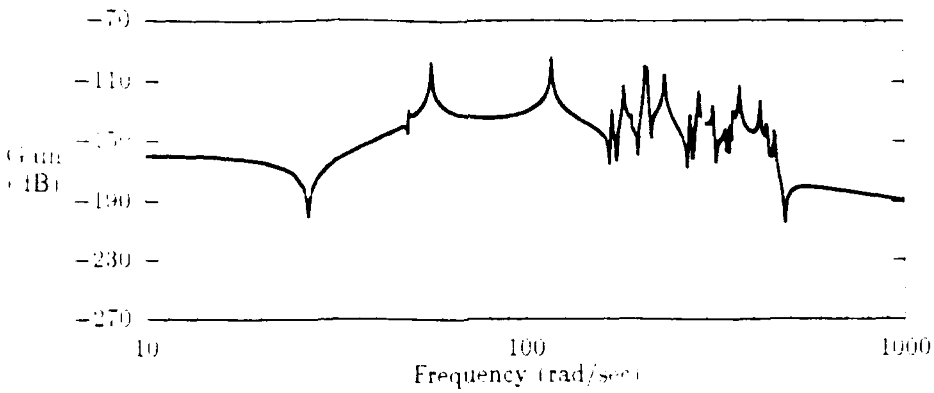

Figure C.40. Truth Model PMA 2 X-axis Response

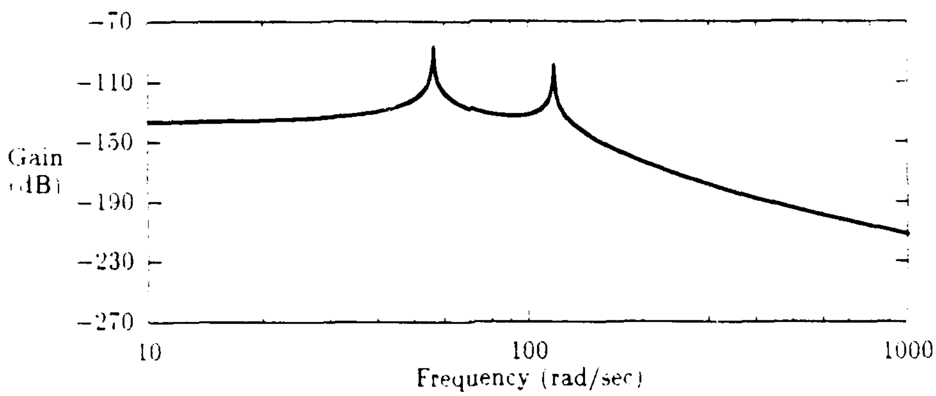

Figure C.41. 12-State Modal Reduced PMA 2 X-axis Response

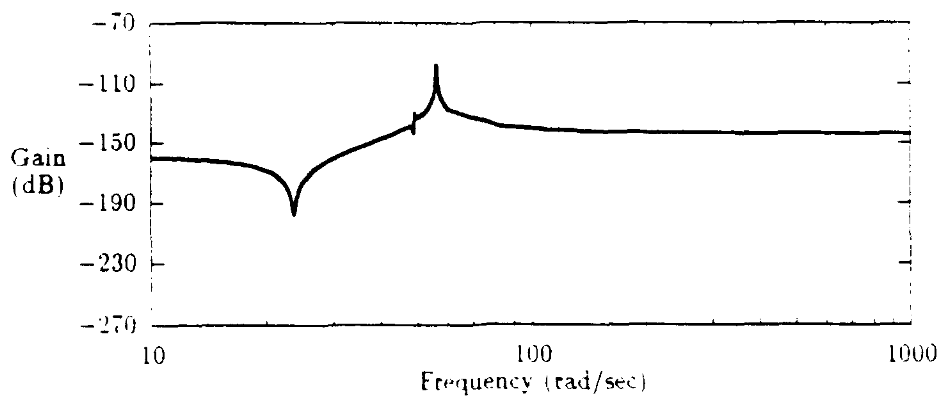

Figure C.42. 6-State Modal Reduced PMA 2 X-axis Response

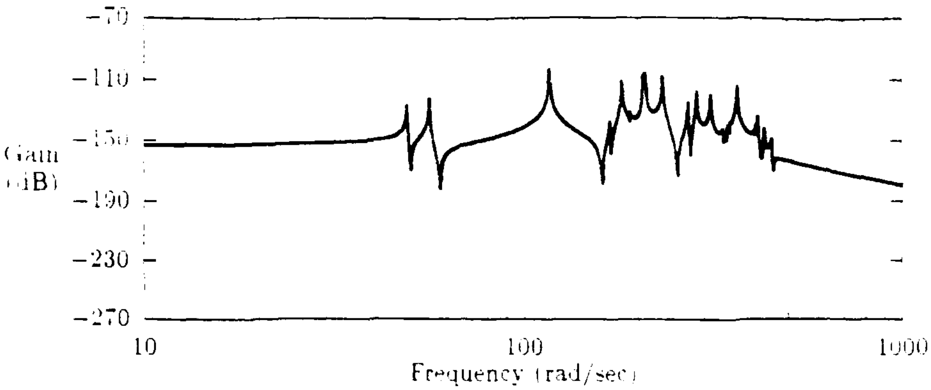

Figure C.43. Truth Model PMA 3 X-axis Response

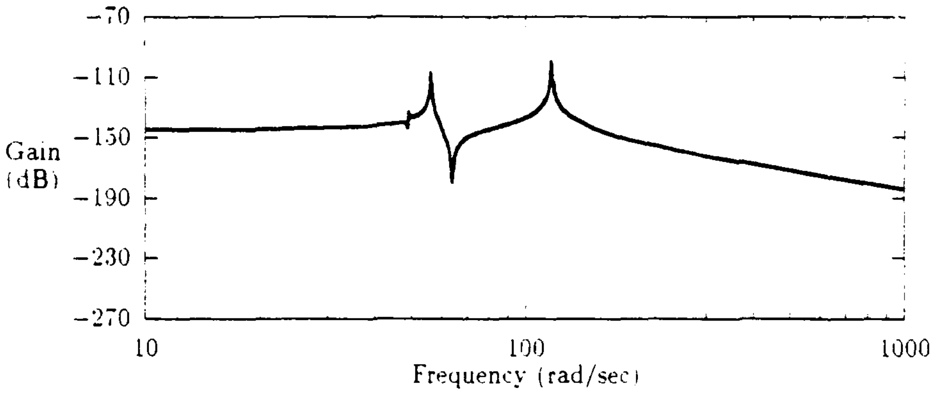

Figure C.44. 12-State Modal Reduced PMA 3 X-axis Response

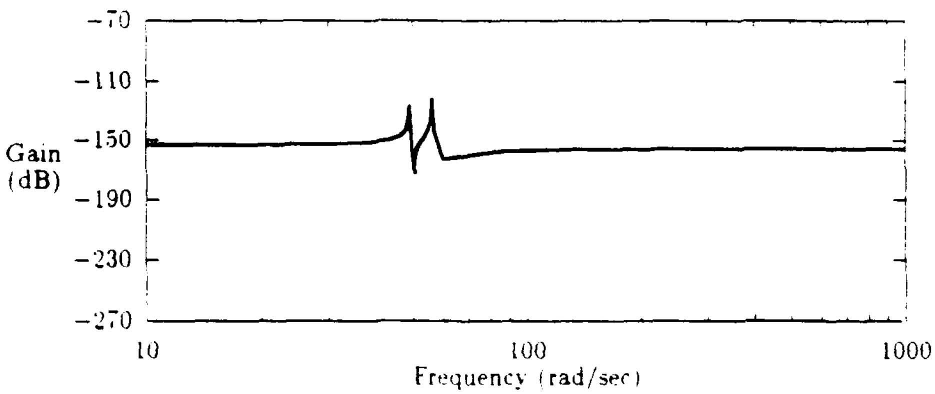

Figure C.45. 6-State Modal Reduced PMA 3 X-axis Response

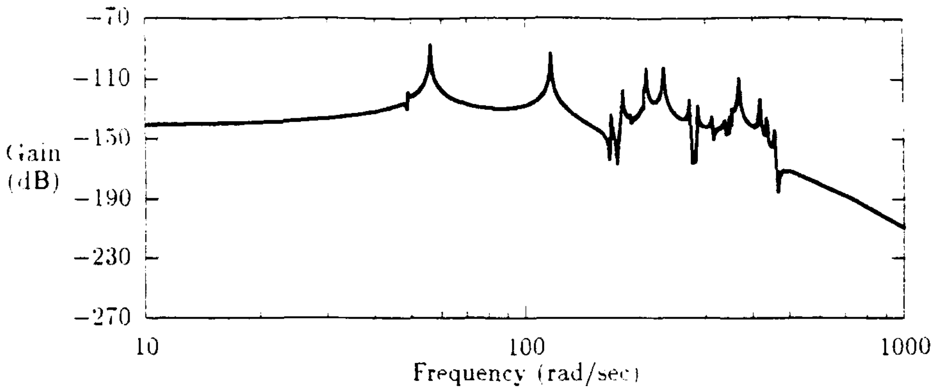

Figure C.46. Truth Model PMA 4 X-axis Response

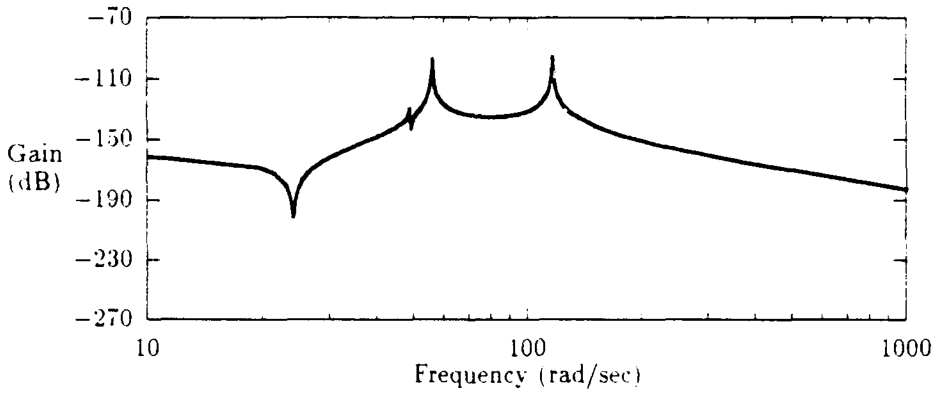

Figure C.47. 12-State Modal Reduced PMA 4 X-axis Response

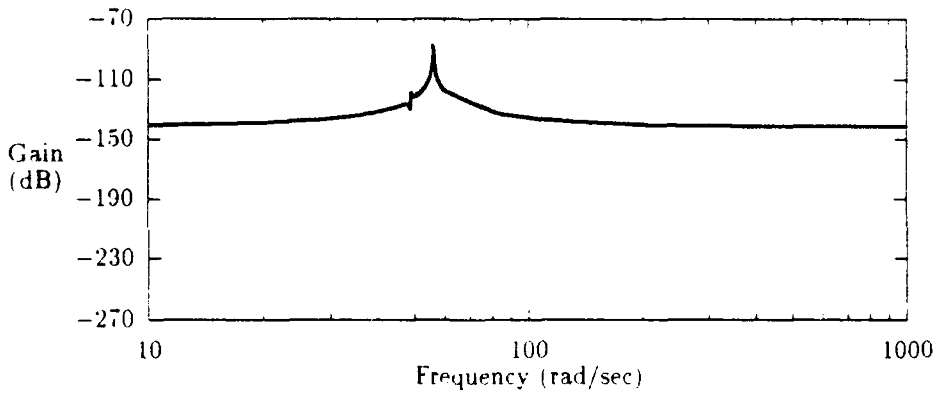

Figure C.48. 6-State Modal Reduced PMA 4 X-axis Response

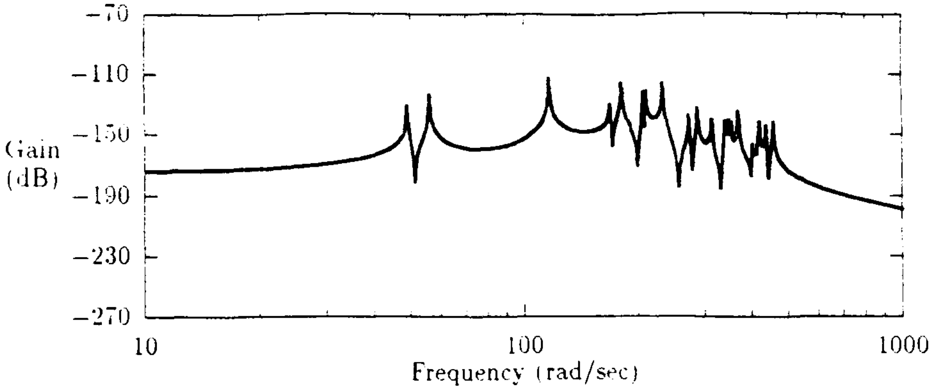

Figure C.49. Truth Model PMA 5 X-axis Response

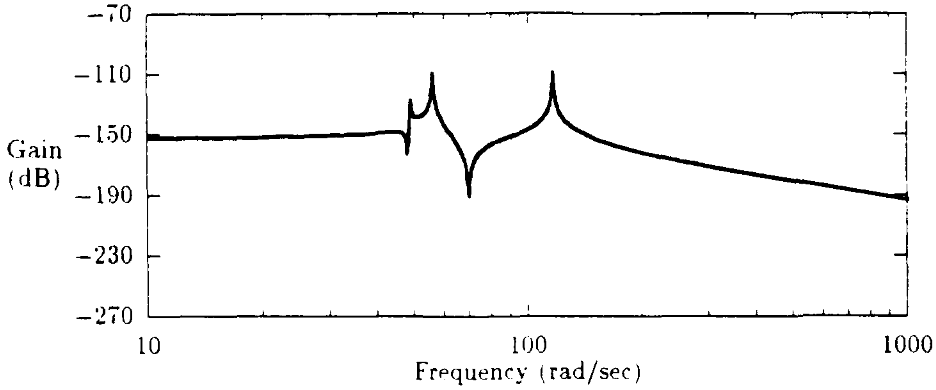

Figure C.50. 12-State Modal Reduced PMA 5 X-axis Response

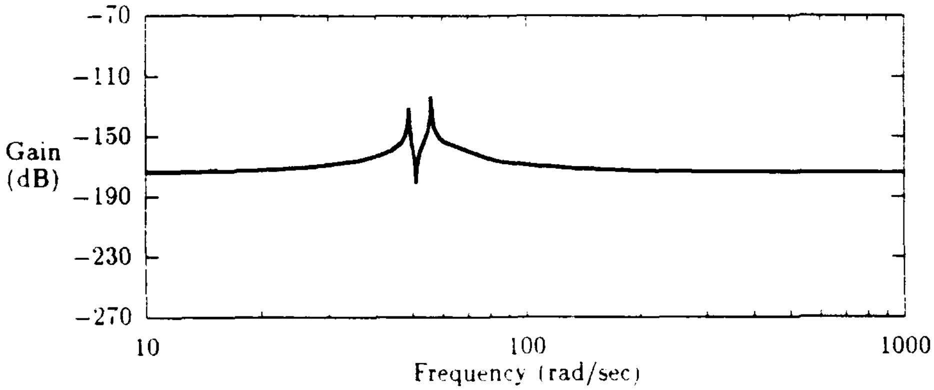

Figure C.51. 6-State Modal Reduced PMA 5 X-axis Response

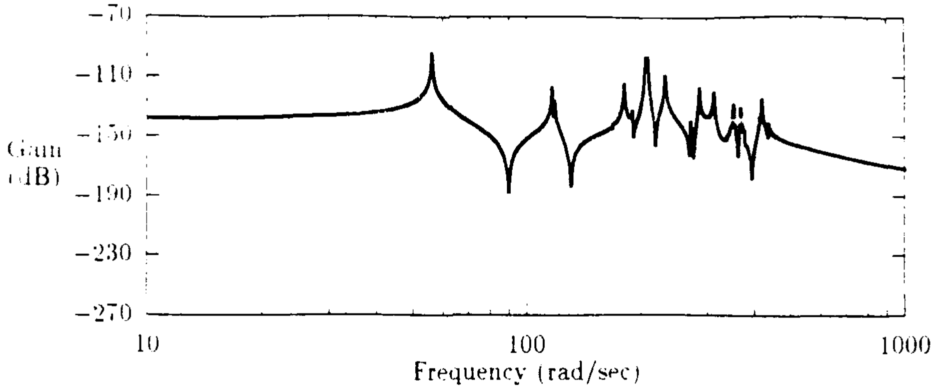

Figure C.52. Truth Model PMA 6 X-axis Response

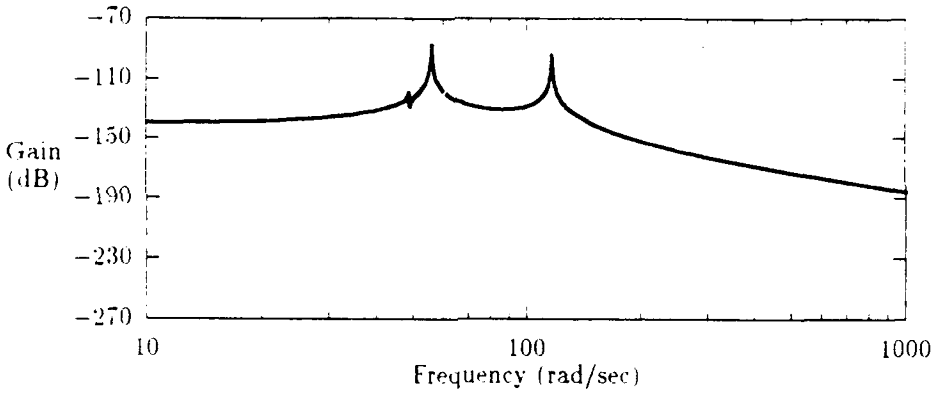

Figure C.53. 12-State Modal Reduced PMA 6 X-axis Response

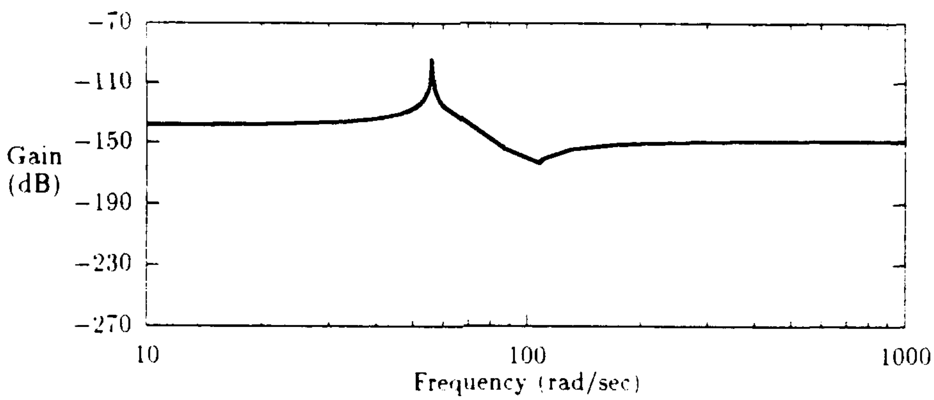

Figure C.54. 6-State Modal Reduced PMA 6 X-axis Response

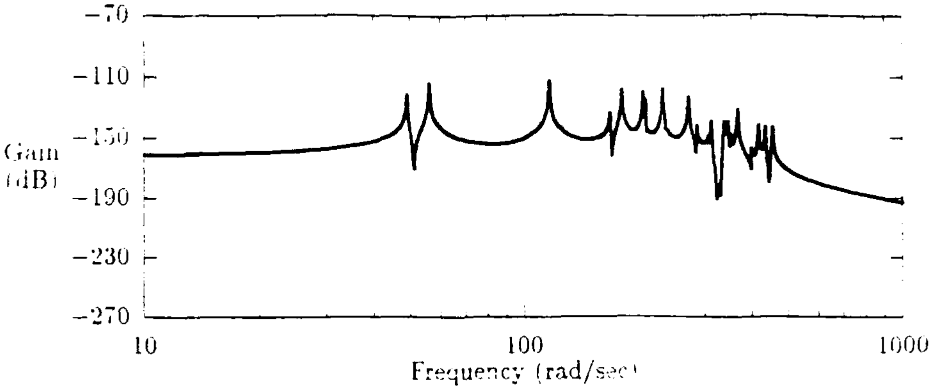

Figure C.55. Truth Model PMA 7 X-axis Response

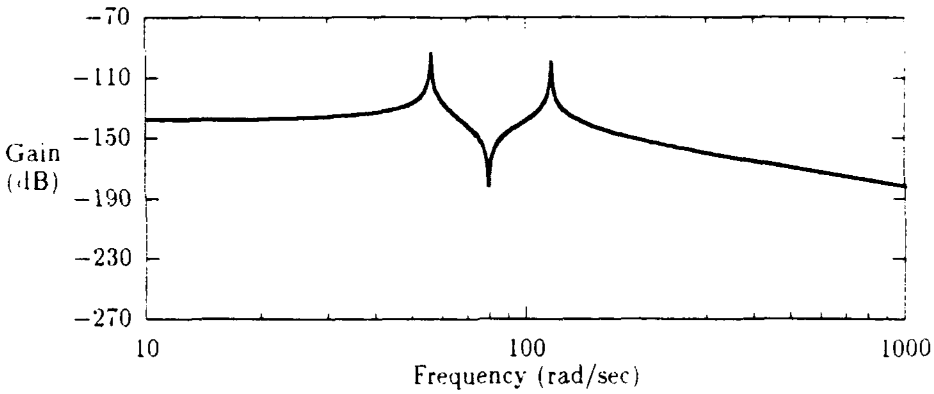

Figure C.56. 12-State Modal Reduced PMA 7 X-axis Response

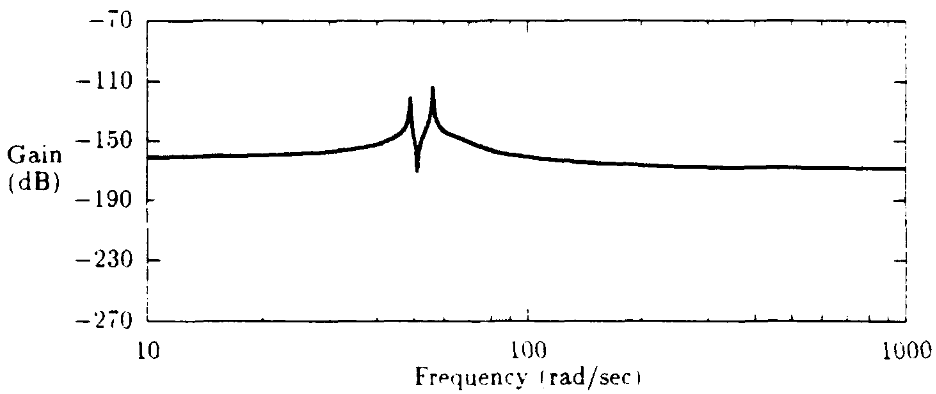

Figure C.57. 6-State Modal Reduced PMA 7 X-axis Response

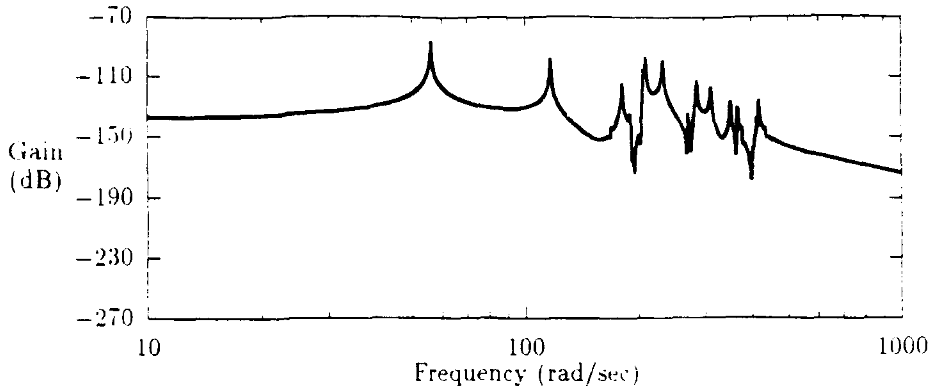

Figure C.58. Truth Model PMA 8 X-axis Response

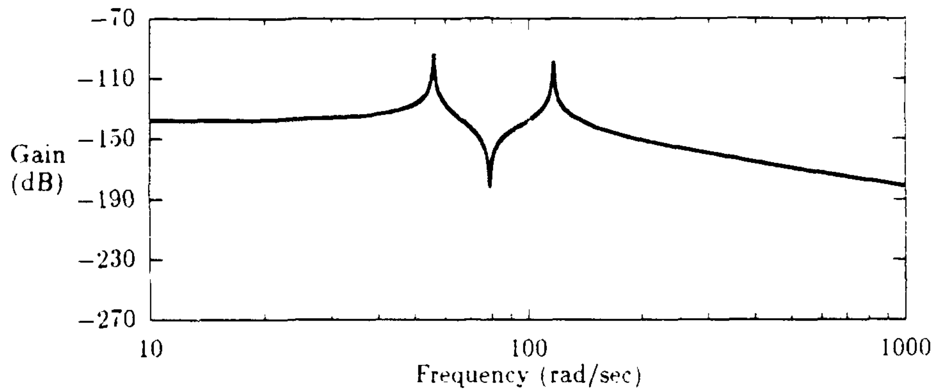

Figure C.59. 12-State Modal Reduced PMA 8 X-axis Response

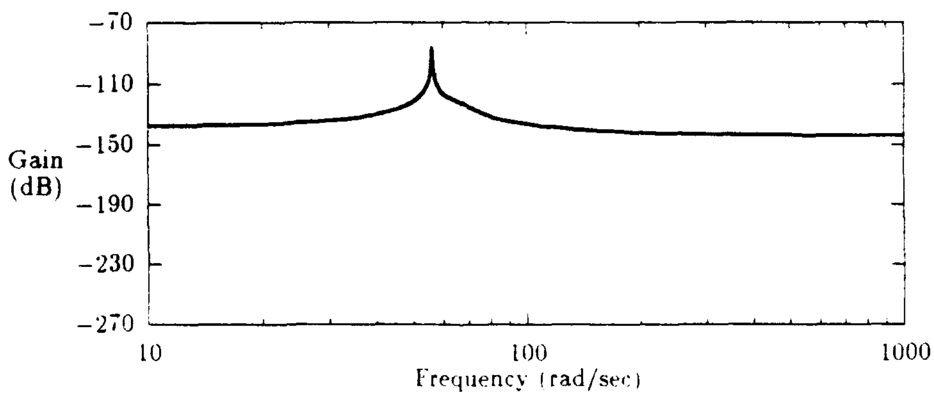

Figure C.60. 6-State Modal Reduced PMA 8 X-axis Response

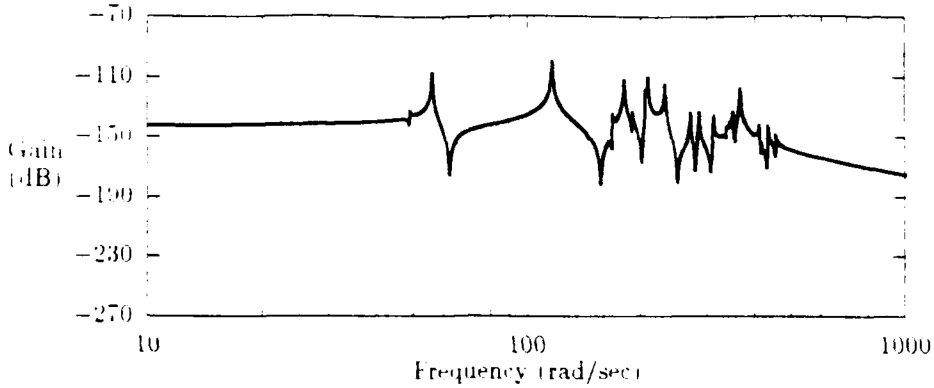

Figure C.61. Truth Model PMA 9 X-axis Response

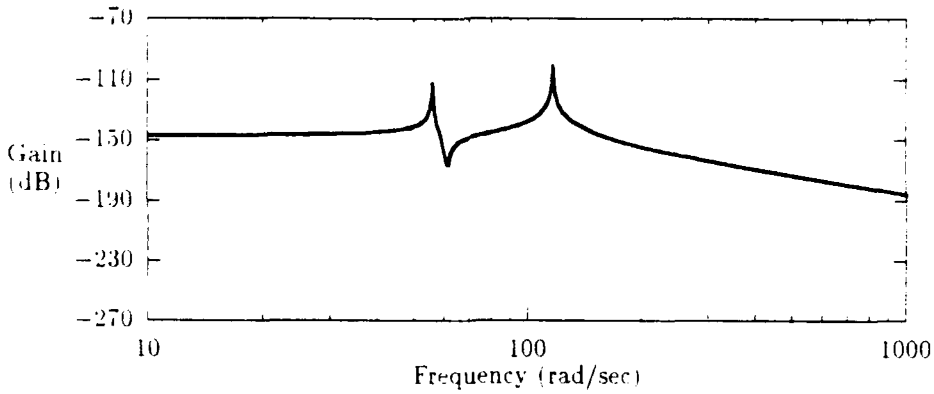

Figure C.62. 12-State Modal Reduced PMA 9 X-axis Response

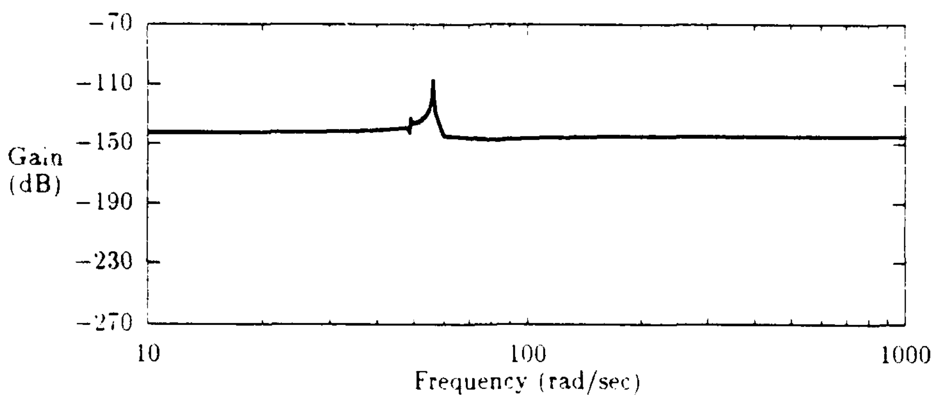

Figure C.63. 6-State Modal Reduced PMA 9 X-axis Response

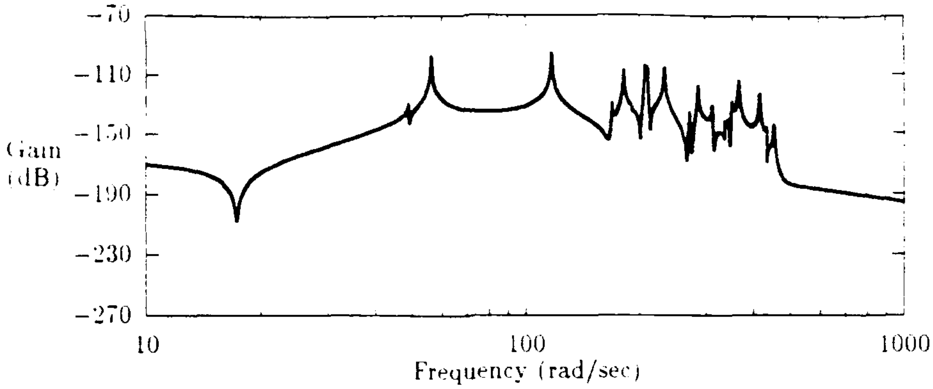

Figure C.64. Truth Model PMA 10 X-axis Response

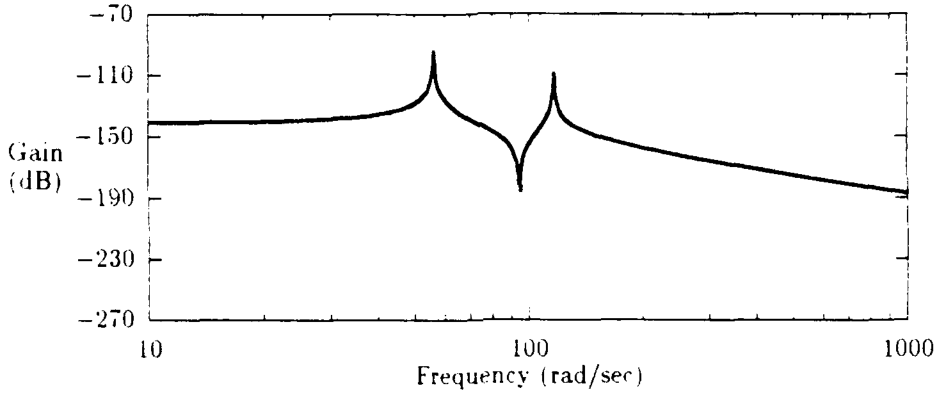

Figure C.65. 12-State Modal Reduced PMA 10 X-axis Response

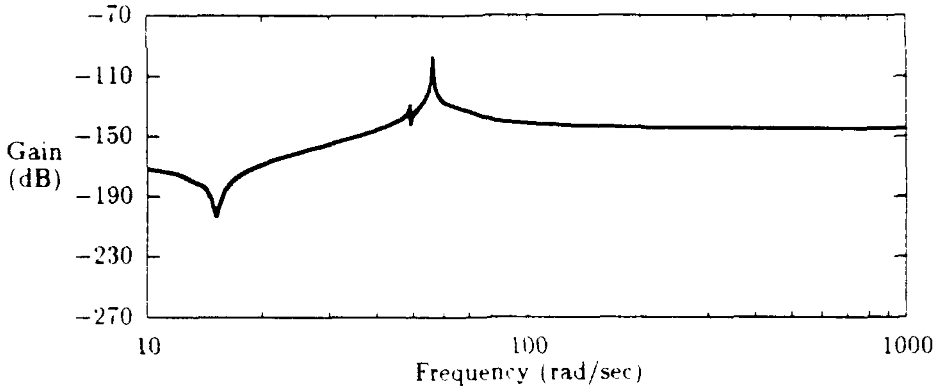

Figure C.66. 6-State Modal Reduced PMA 10 X-axis Response

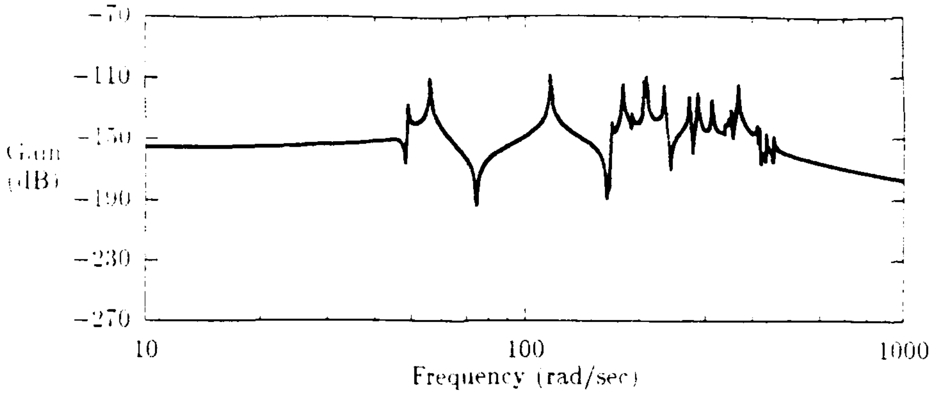

Figure C.67. Truth Model PMA 11 X-axis Response

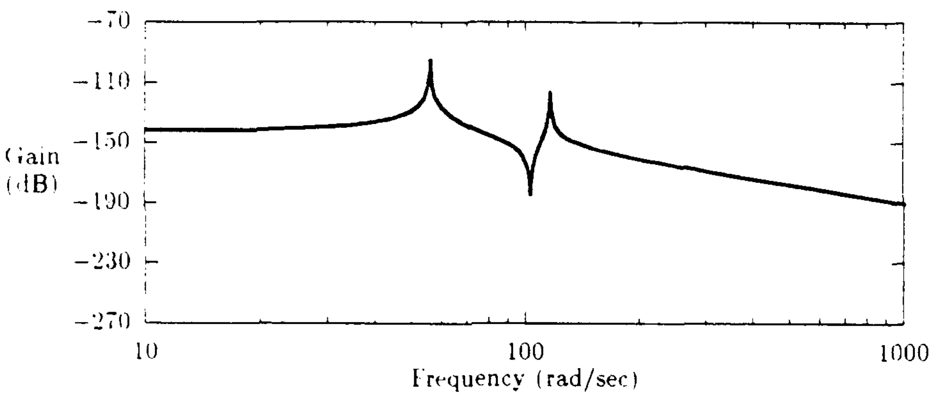

Figure C.68. 12-State Modal Reduced PMA 11 X-axis Response

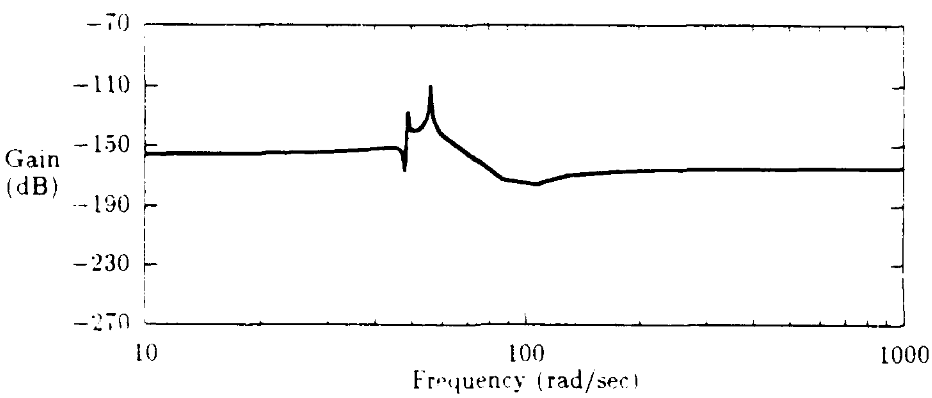

Figure C.69. 6-State Modal Reduced PMA 11 X-axis Response

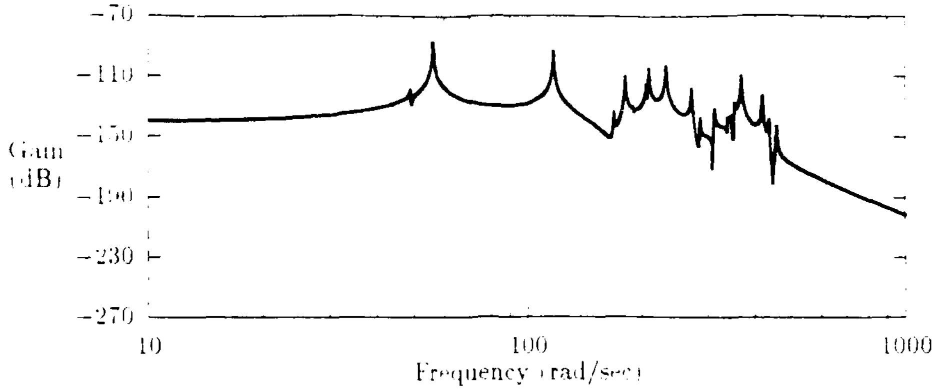

Figure C.70. Truth Model PMA 12 X-axis Response

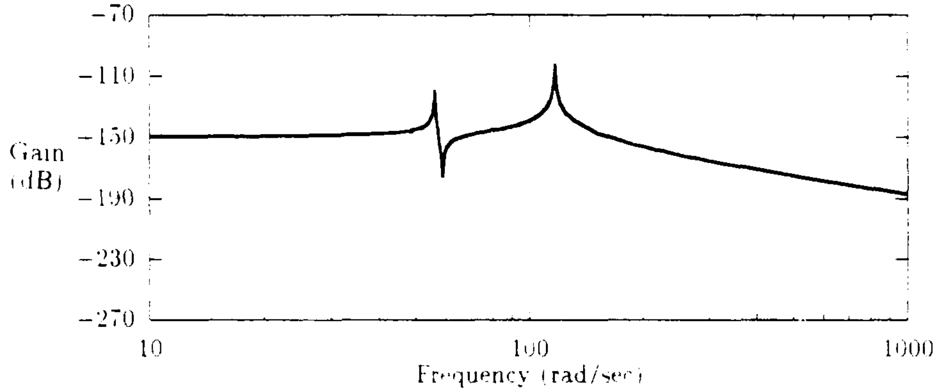

Figure C.71. 12-State Modal Reduced PMA 12 X-axis Response

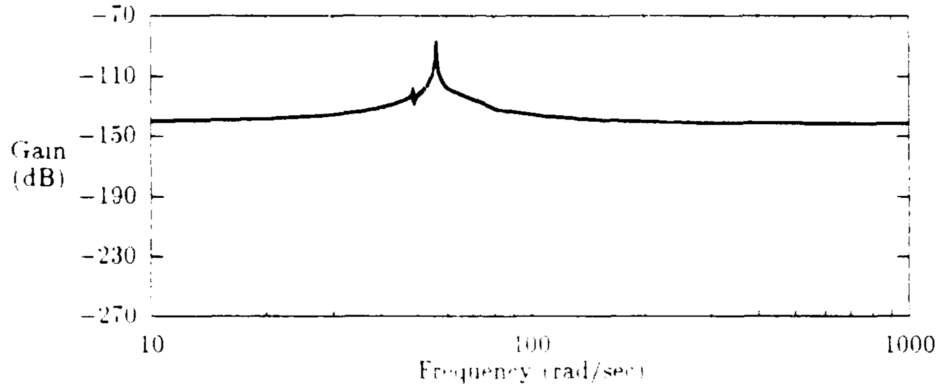

Figure C.72. 6-State Modal Reduced PMA 12 X-axis Response

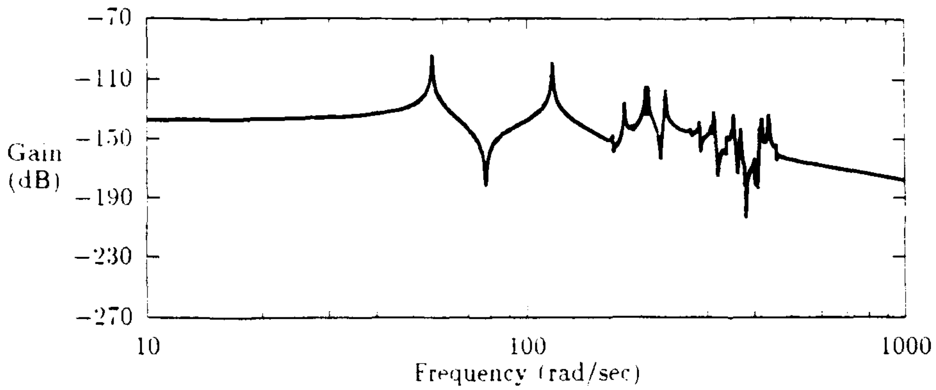

Figure C.73. Truth Model PMA 13 X-axis Response

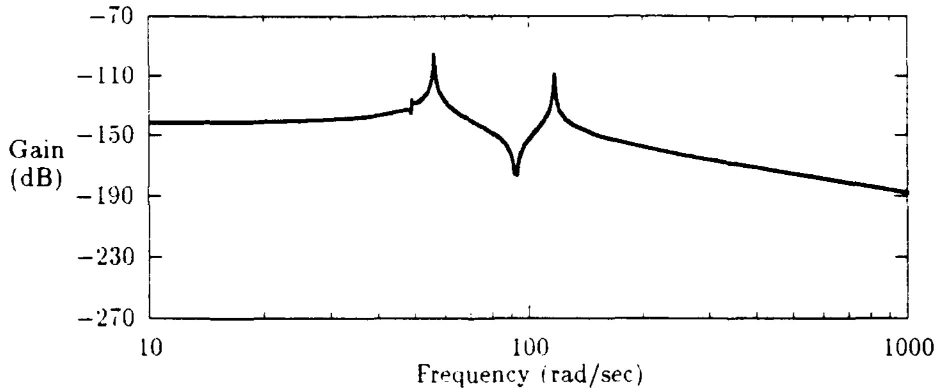

Figure C.74. 12-State Modal Reduced PMA 13 X-axis Response

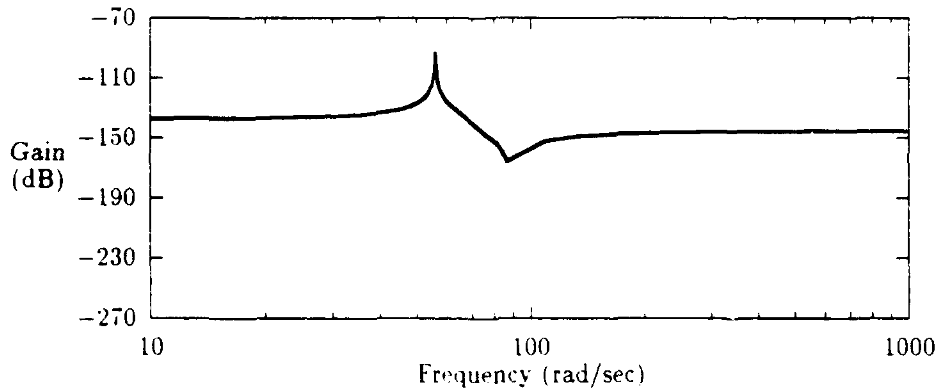

Figure C.75. 6-State Modal Reduced PMA 13 X-axis Response

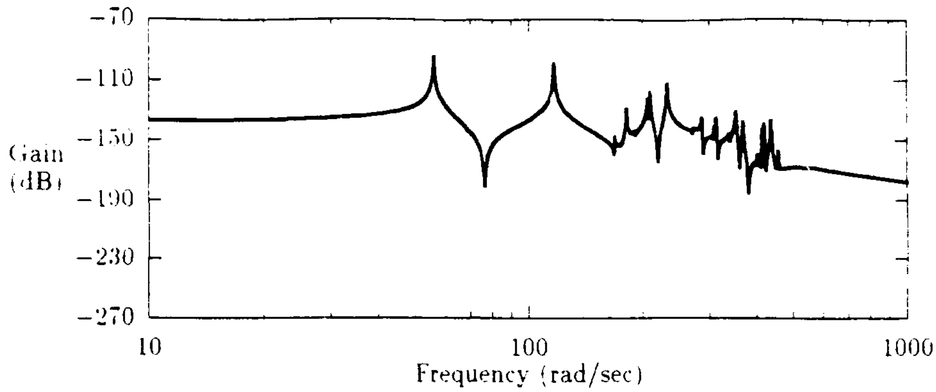

Figure C.76. Truth Model PMA 14 X-axis Response

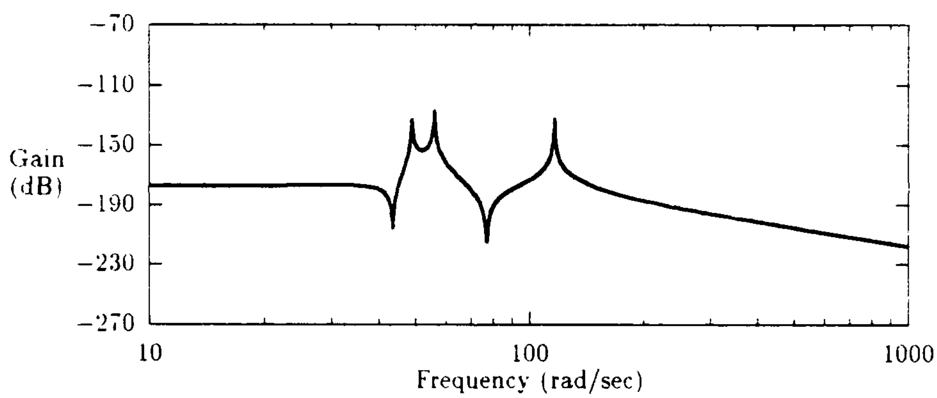

Figure C.77. 12-State Modal Reduced PMA 14 X-axis Response

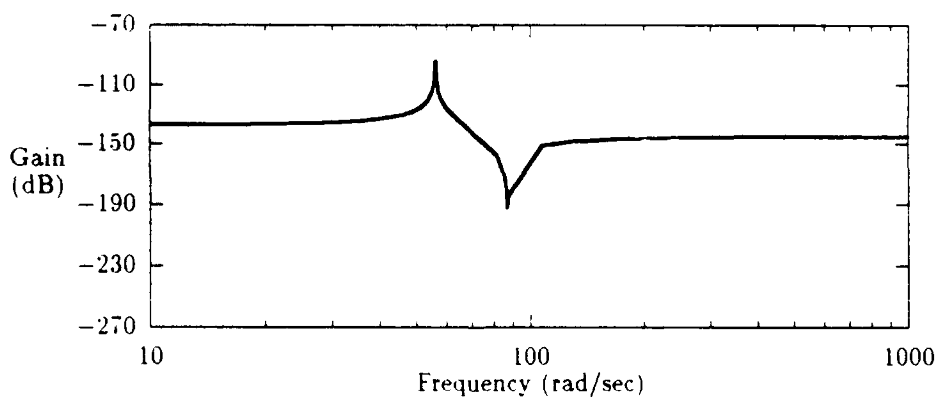

Figure C.78. 6-State Modal Reduced PMA 14 X-axis Response

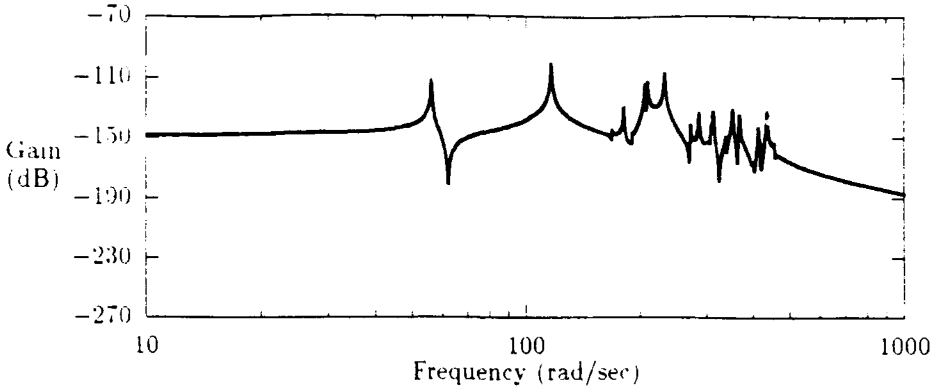

Figure C.79. Truth Model PMA 15 X-axis Response

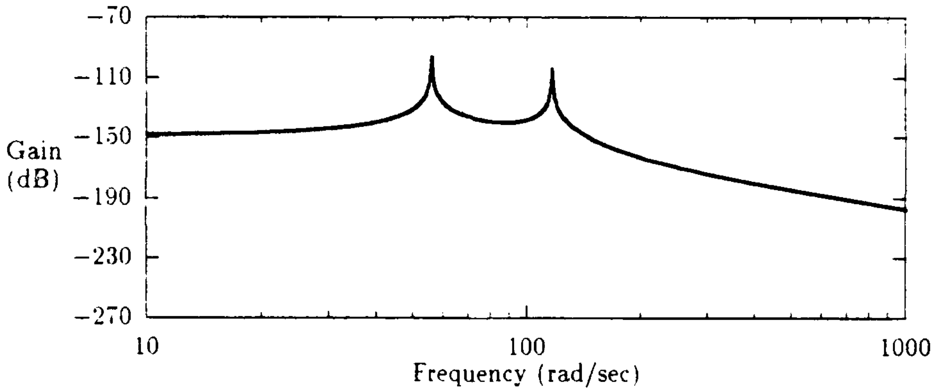

Figure C.80. 12-State Modal Reduced PMA 15 X-axis Response

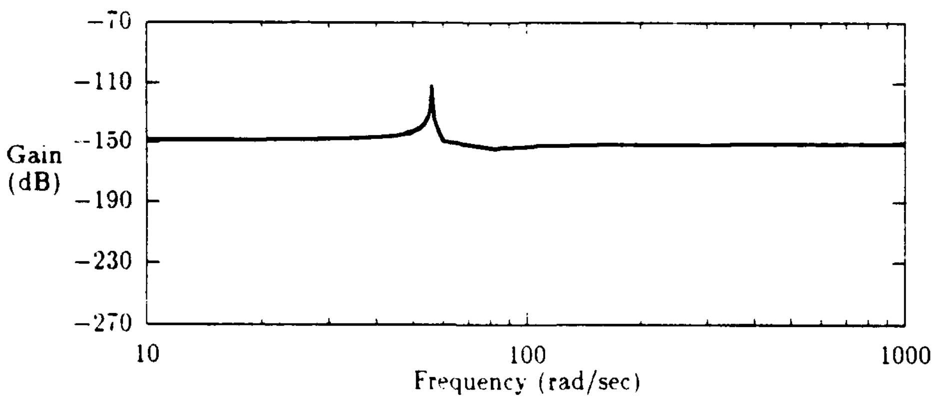

Figure C.81. 6-State Modal Reduced PMA 15 X-axis Response

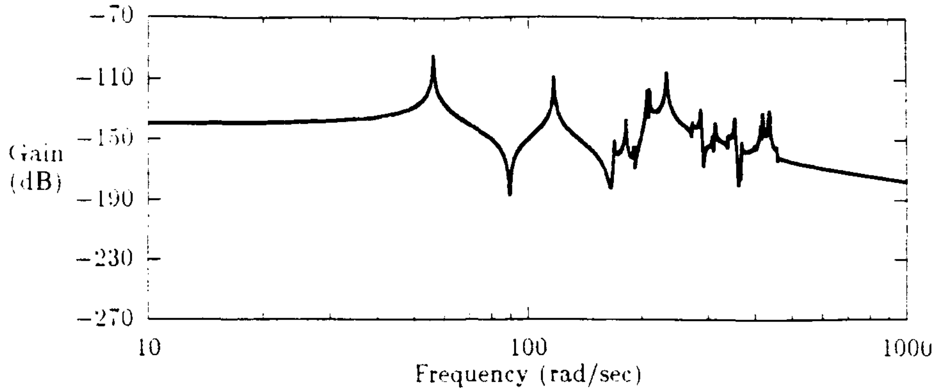

Figure C.82. Truth Model PMA 16 X-axis Response

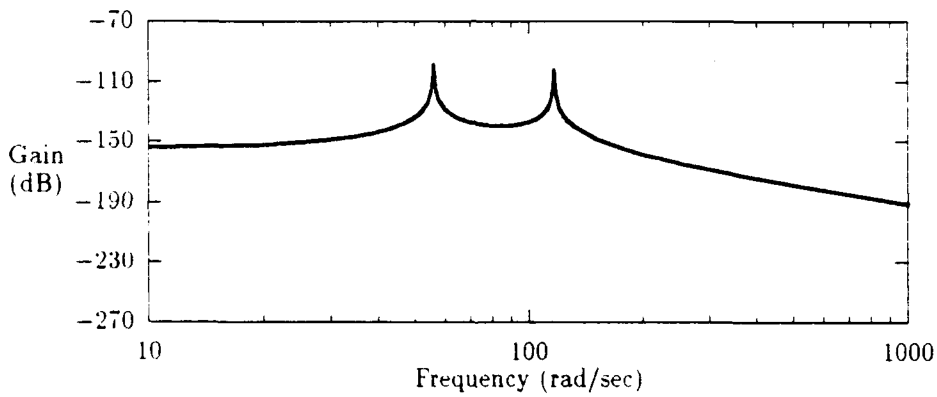

Figure C.83. 12-State Modal Reduced PMA 16 X-axis Response

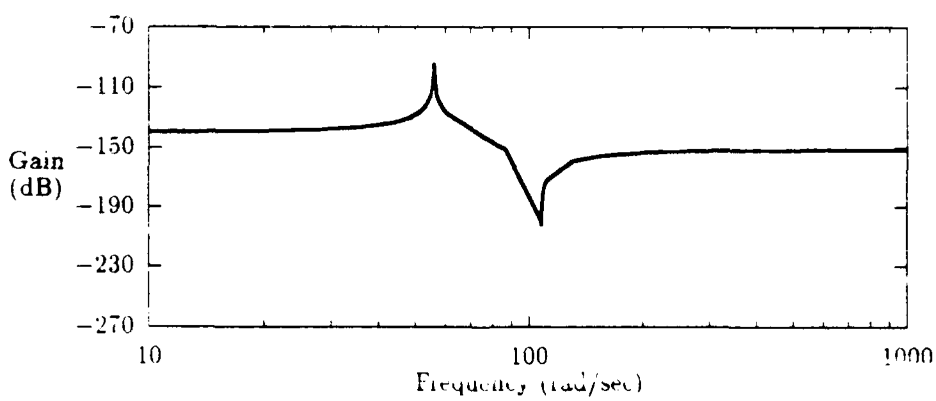

Figure C.84. 6-State Modal Reduced PMA 16 X-axis Response

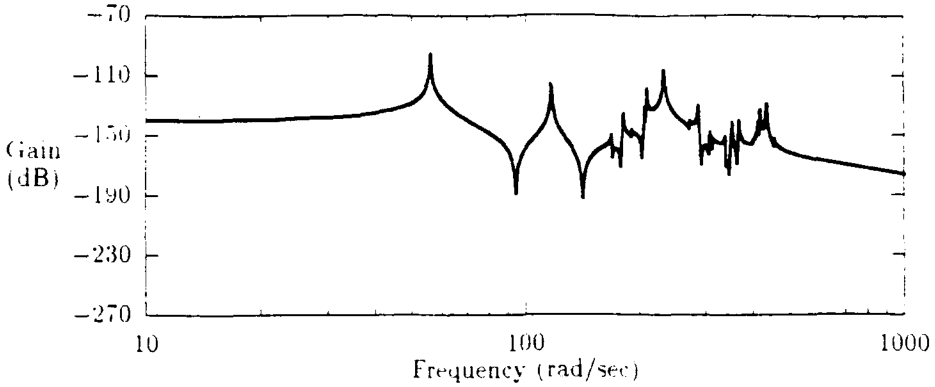

Figure C.85. Truth Model PMA 17 X-axis Response

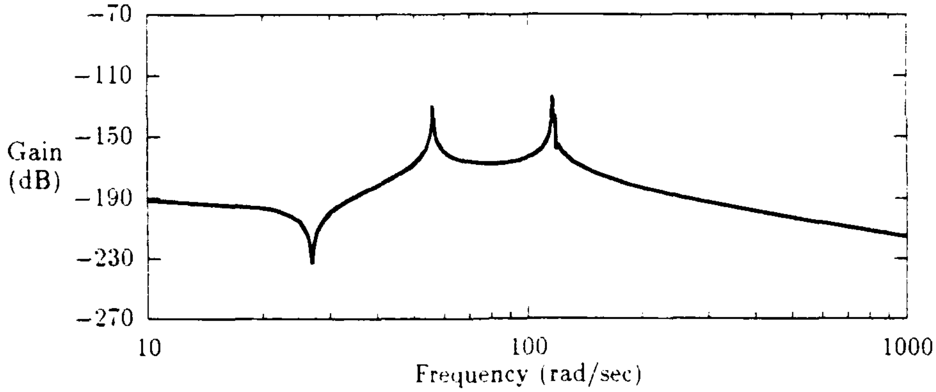

Figure C.86. 12-State Modal Reduced PMA 17 X-axis Response

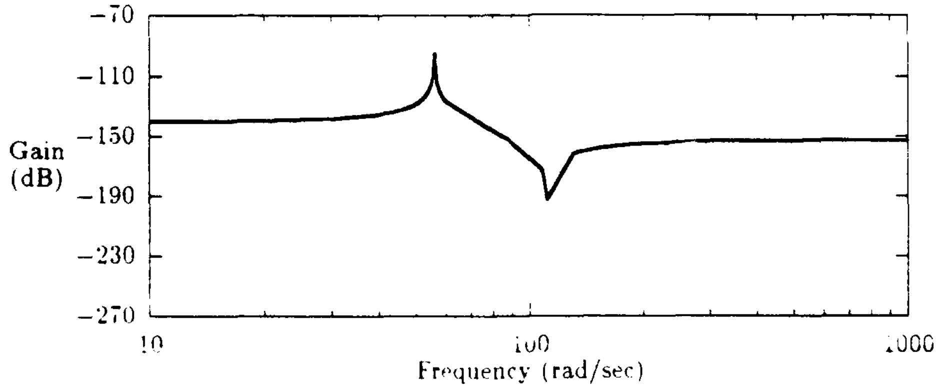

Figure C.87. 6-State Modal Reduced PMA 17 X-axis Response

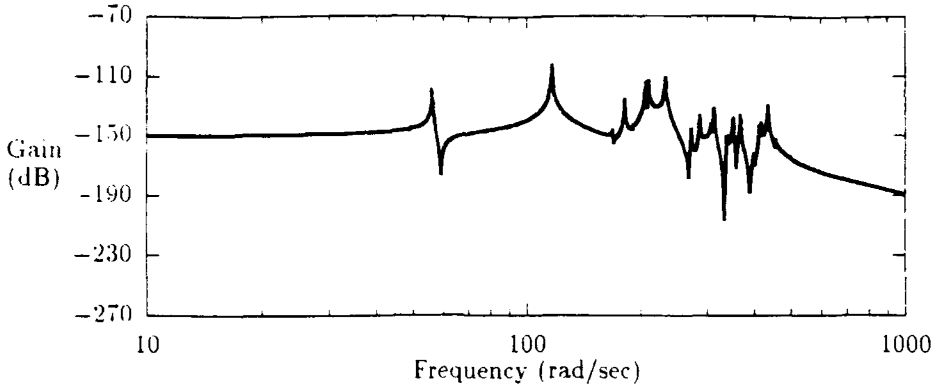

Figure C.88. Truth Model PMA 18 X-axis Response

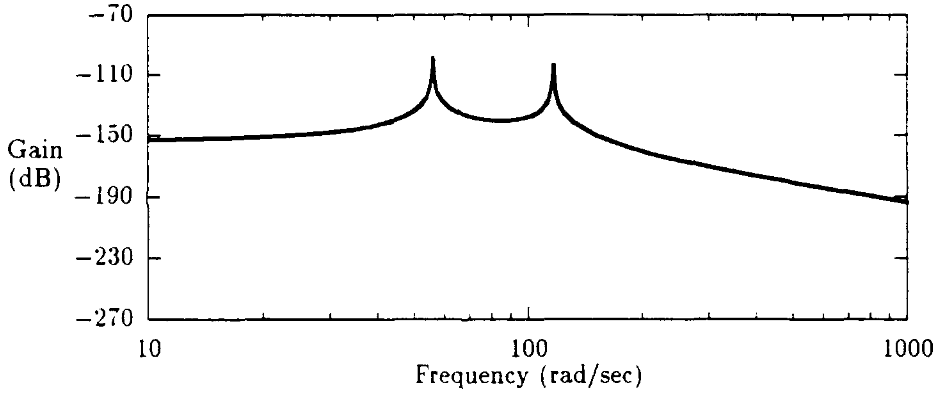

Figure C.89. 12-State Modal Reduced PMA 18 X-axis Response

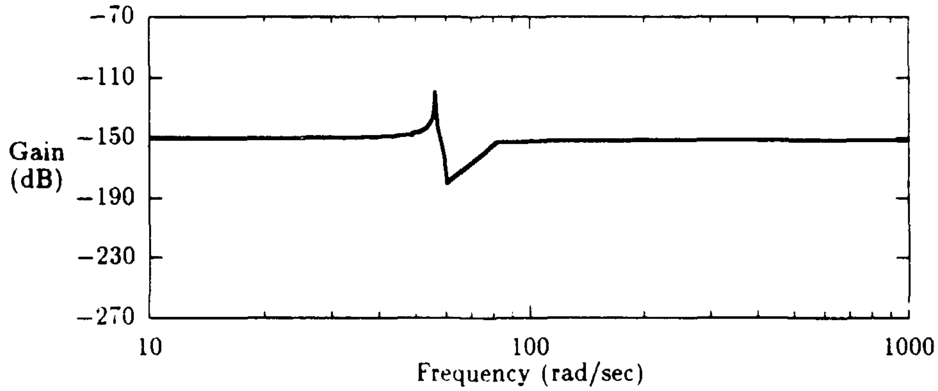

Figure C.90. 6-State Modal Reduced PMA 18 X-axis Response

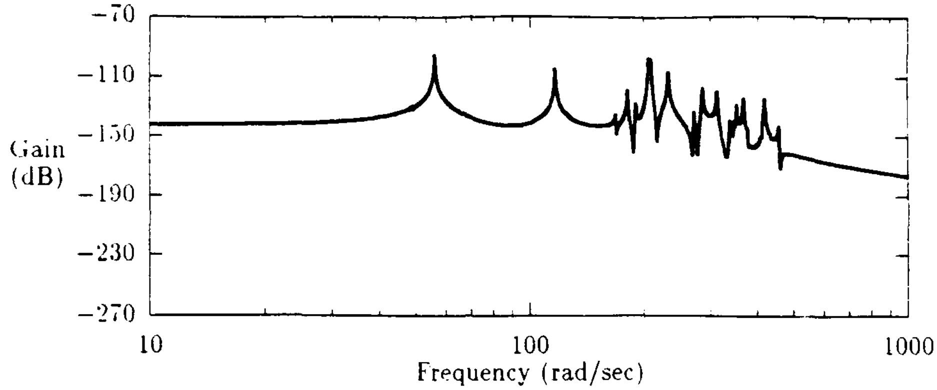

Figure C.91. Truth Model PMA 1 Y-axis Response

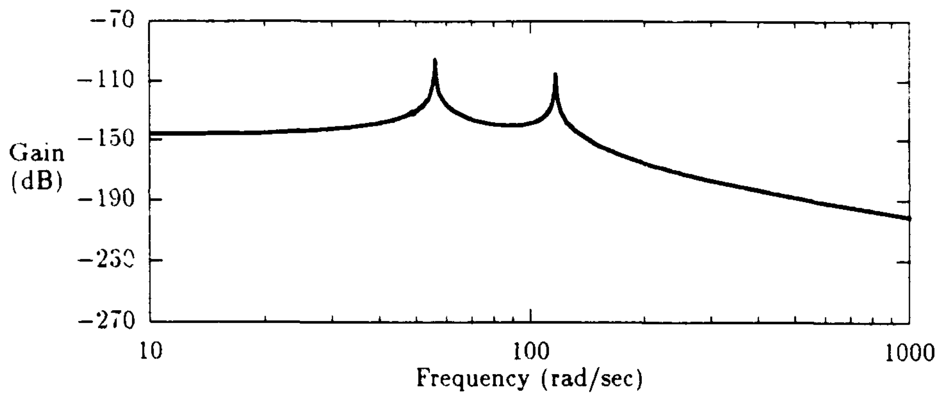

Figure C.92. 12-State Modal Reduced PMA 1 Y-axis Response

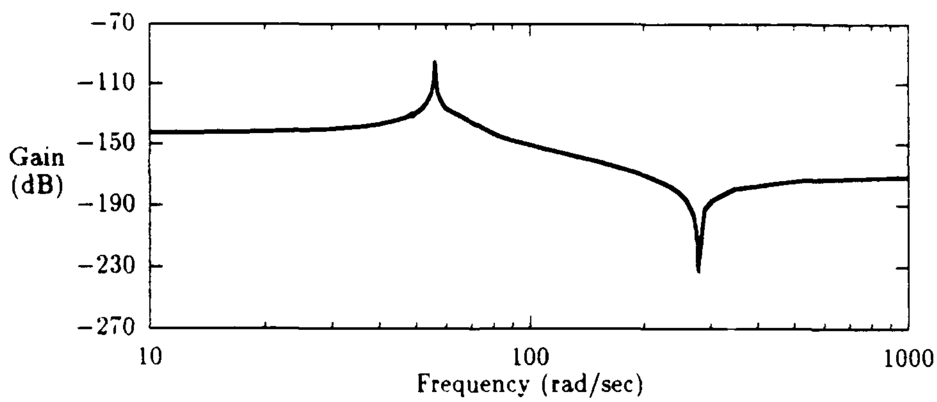

Figure C.93. 6-State Modal Reduced PMA 1 Y-axis Response

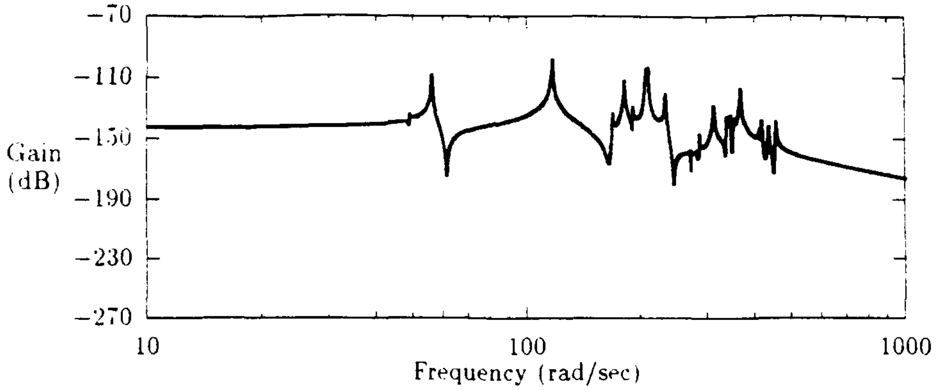

Figure C.94. Truth Model PMA 2 Y-axis Response

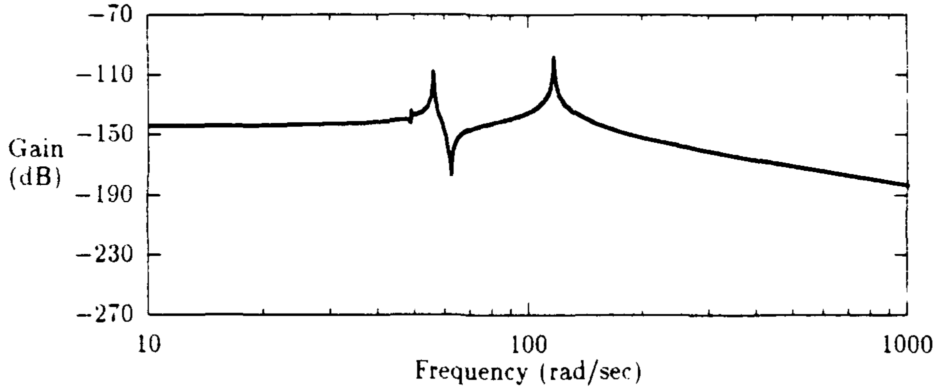

Figure C.95. 12-State Modal Reduced PMA 2 Y-axis Response

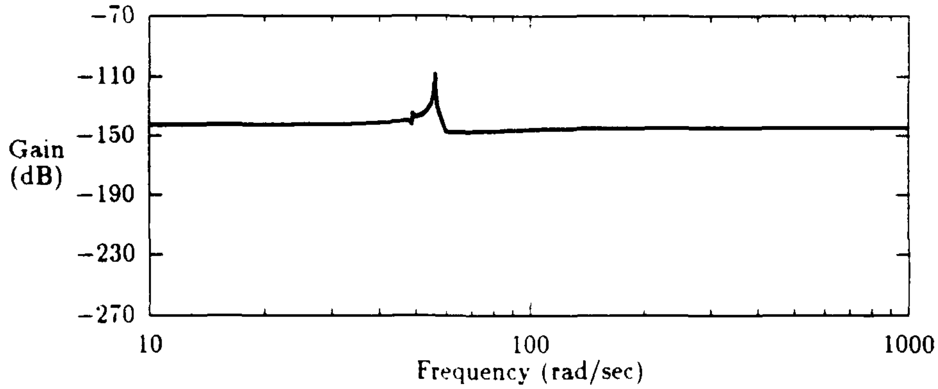

Figure C.96. 6-State Modal Reduced PMA 2 Y-axis Response

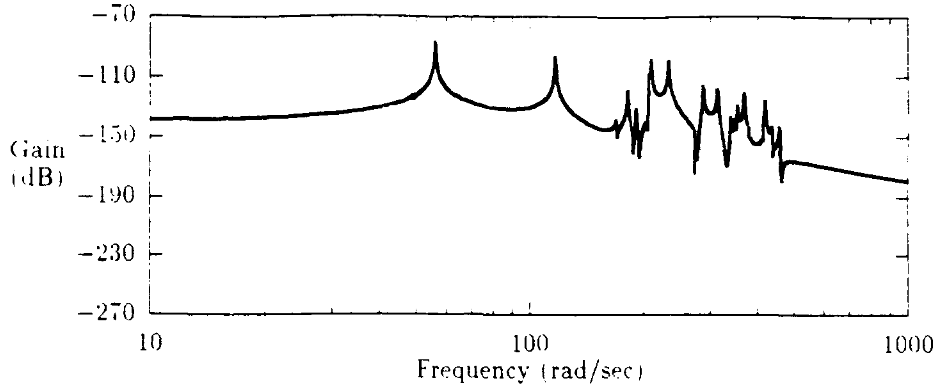

Figure C.97. Truth Model PMA 3 Y-axis Response

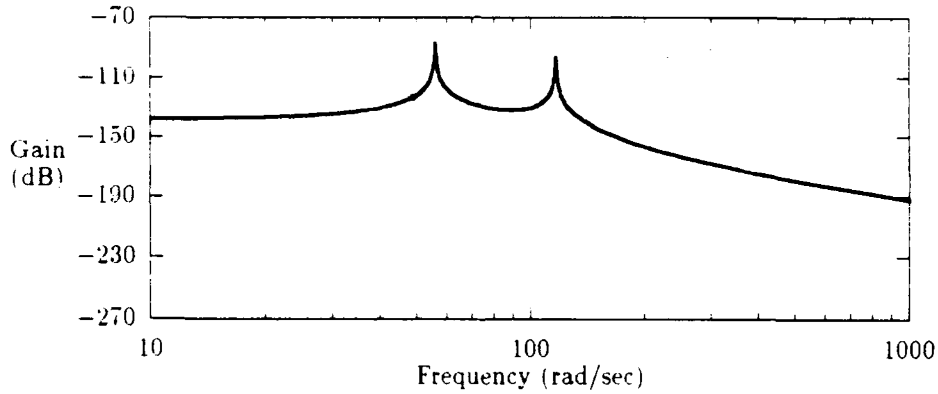

Figure C.98. 12-State Modal Reduced PMA 3 Y-axis Response

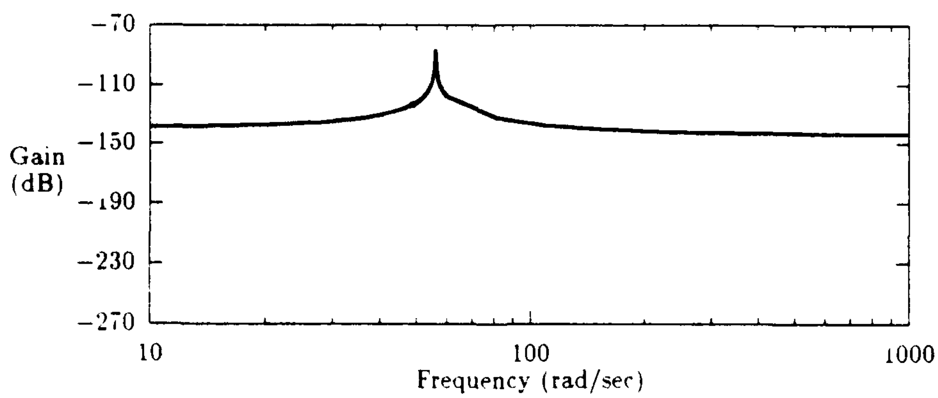

Figure C.99. 6-State Modal Reduced PMA 3 Y-axis Response

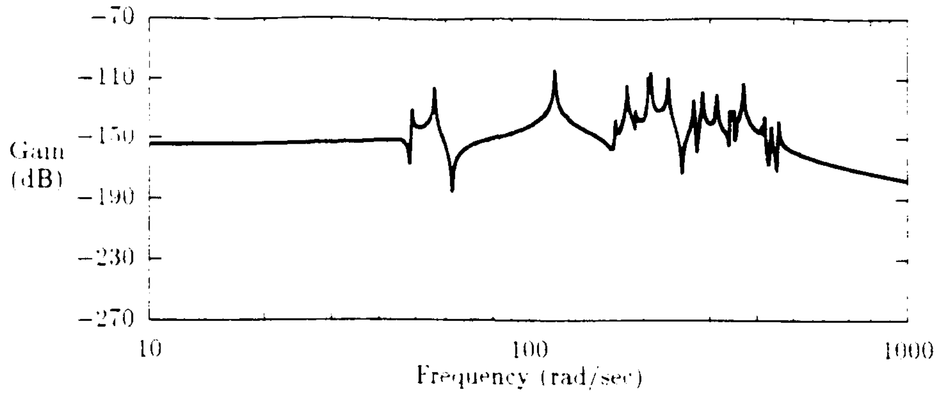

Figure C.100. Truth Model PMA 4 Y-axis Response

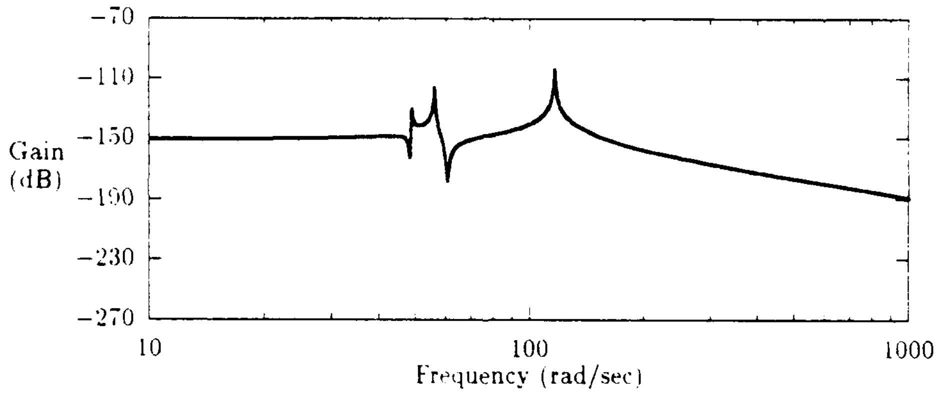

Figure C.101. 12-State Modal Reduced PMA 4 Y-axis Response

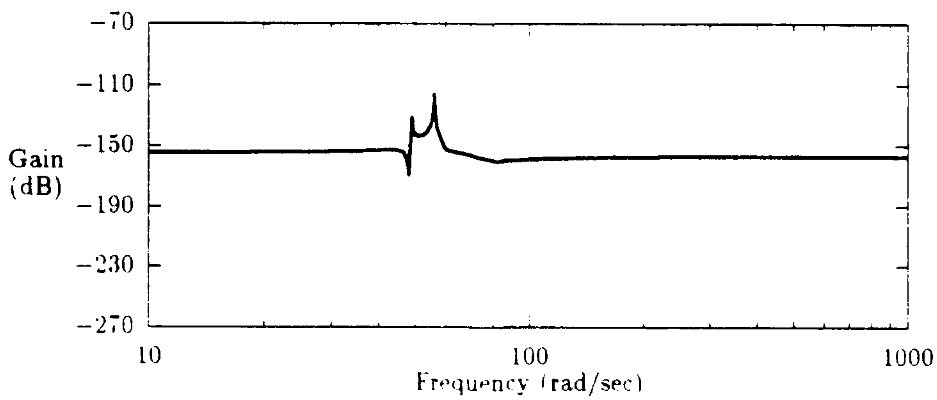

Figure C.102. 6-State Modal Reduced PMA 4 Y-axis Response

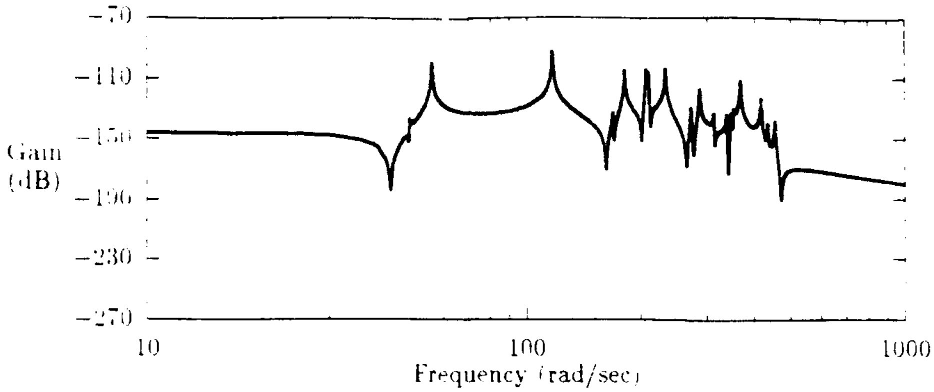

Figure C.103. Truth Model PMA 5 Y-axis Response

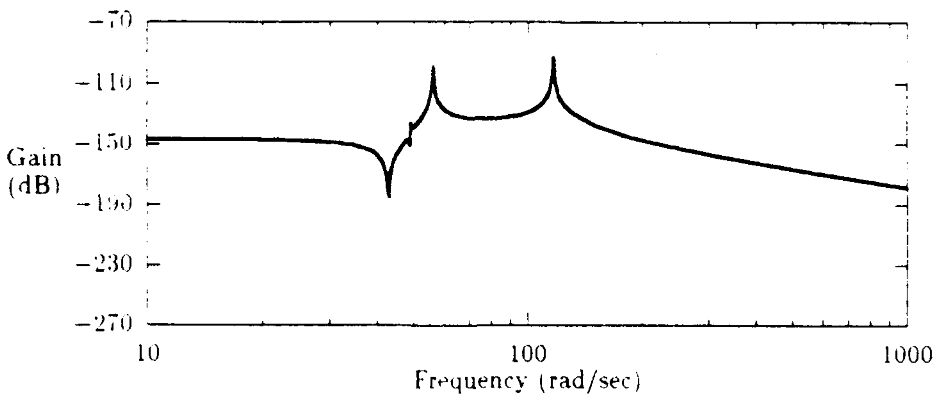

Figure C.104. 12-State Modal Reduced PMA 5 Y-axis Response

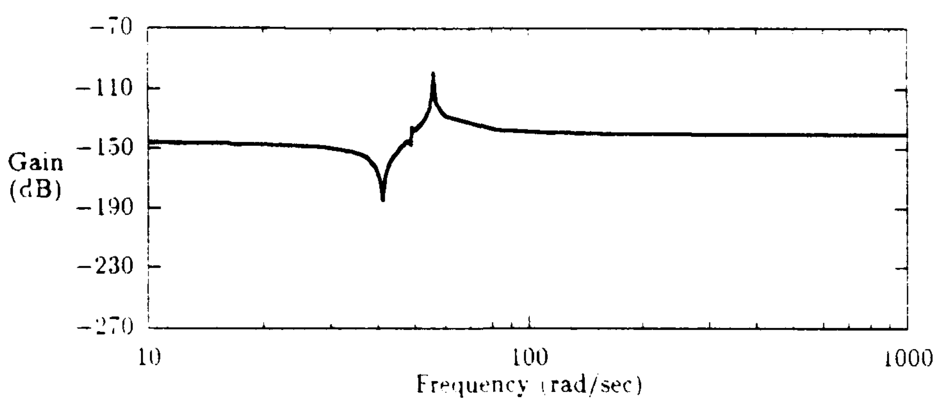

Figure C.105. 6-State Modal Reduced PMA 5 Y-axis Response

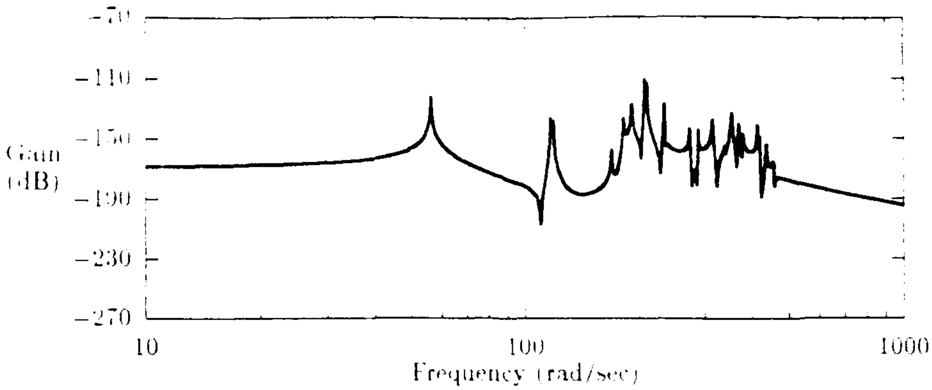

Figure C.106. Truth Model PMA 6 Y-axis Response

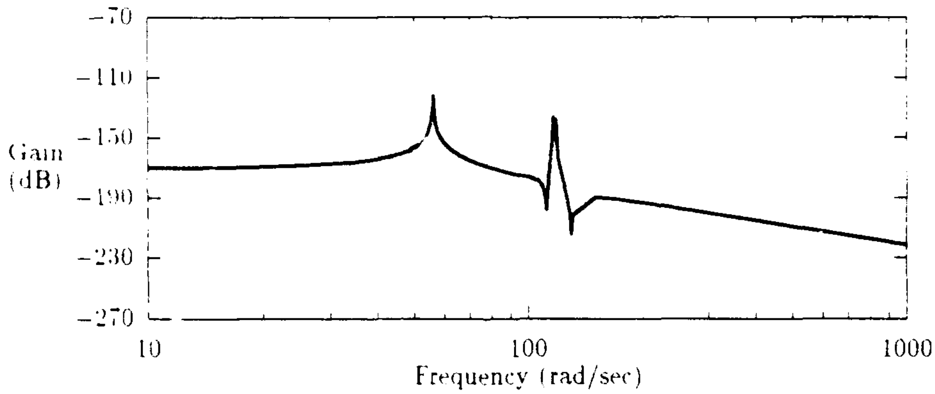

Figure C.107. 12-State Modal Reduced PMA 6 Y-axis Response

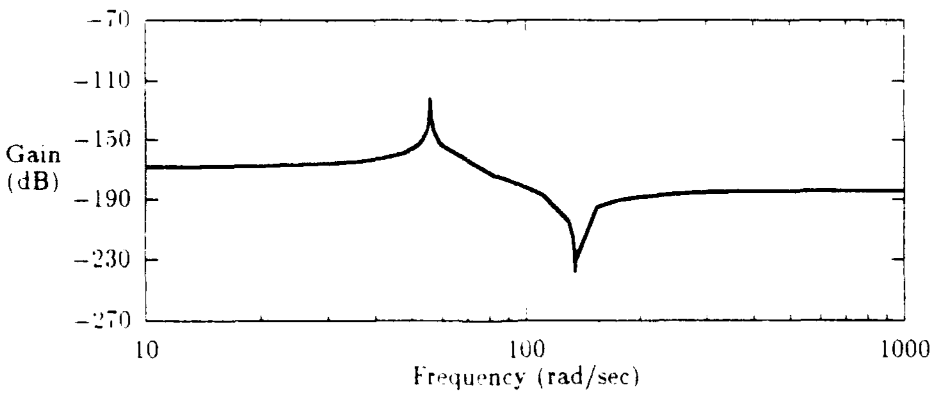

Figure C.108. 6-State Modal Reduced PMA 6 Y-axis Response

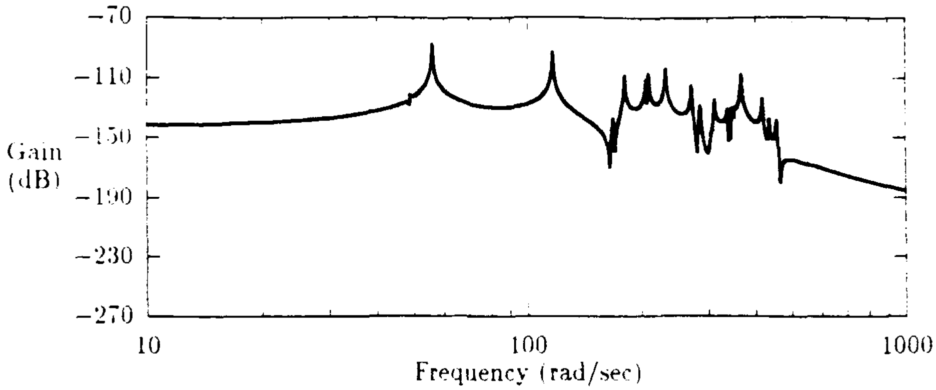

Figure C.109. Truth Model PMA 7 Y-axis Response

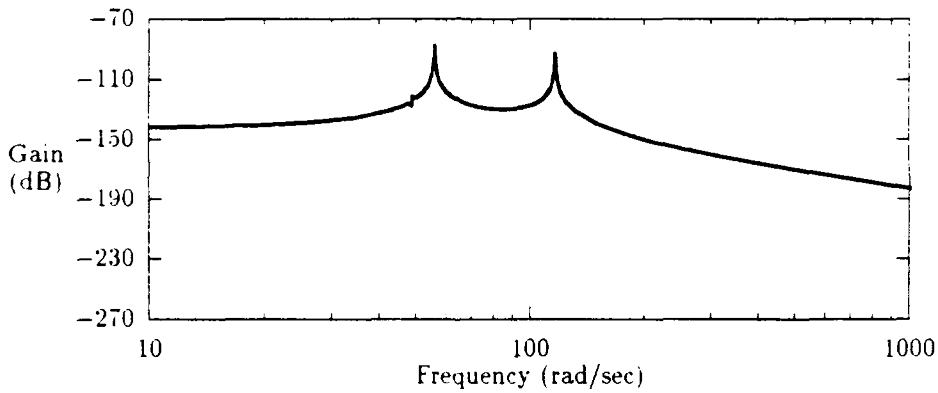

Figure C.110. 12-State Modal Reduced PMA 7 Y-axis Response

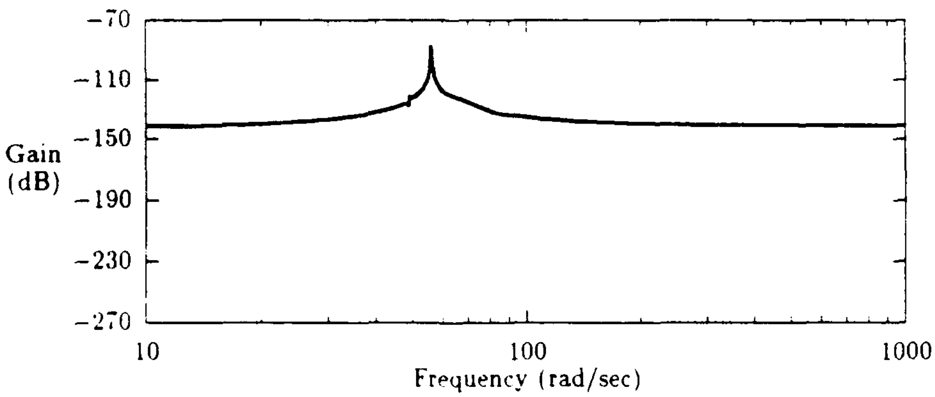

Figure C.111. 6-State Modal Reduced PMA 7 Y-axis Response

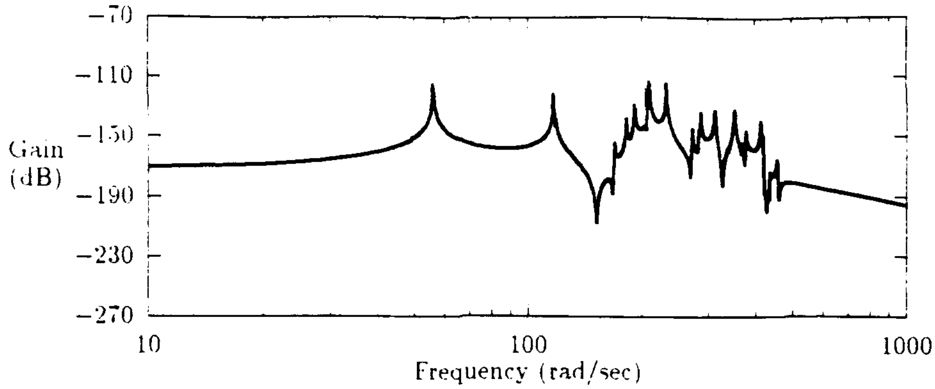

Figure C.112. Truth Model PMA 8 Y-axis Response

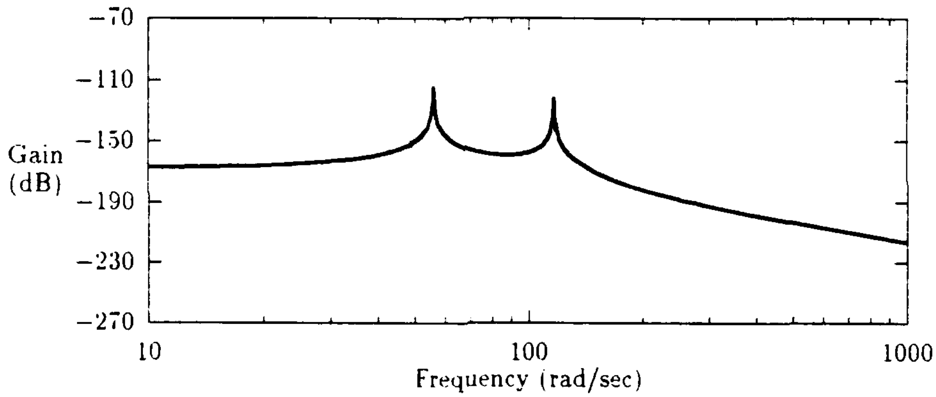

Figure C.113. 12-State Modal Reduced PMA 8 Y-axis Response

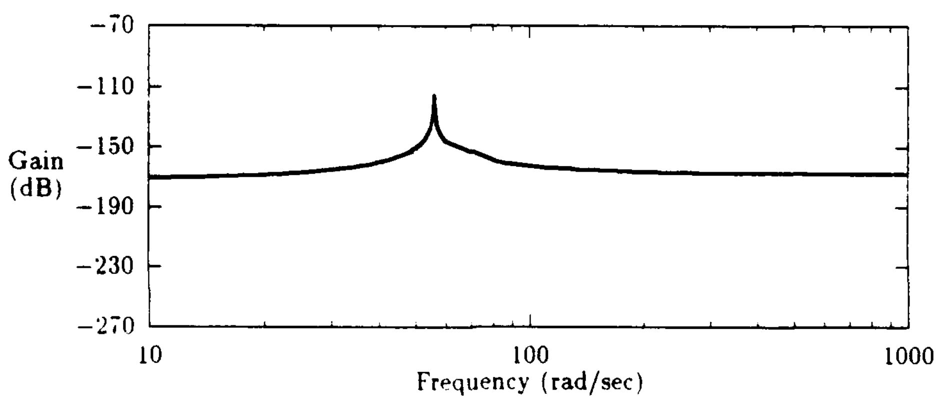

Figure C.114. 6-State Modal Reduced PMA 8 Y-axis Response

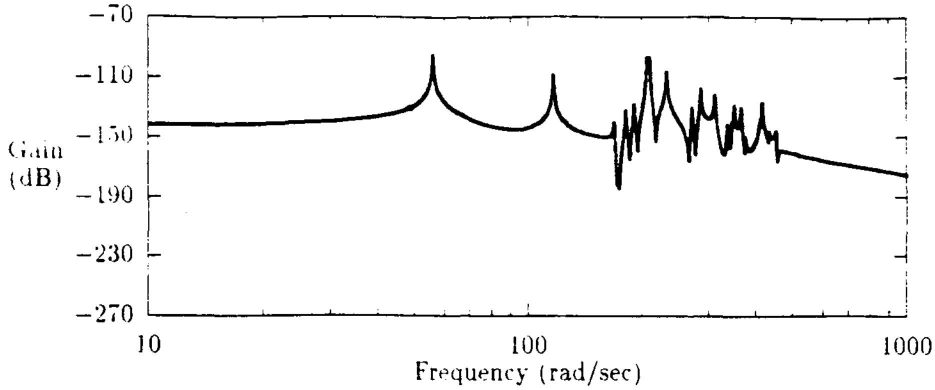

Figure C.115. Truth Model PMA 9 Y-axis Response

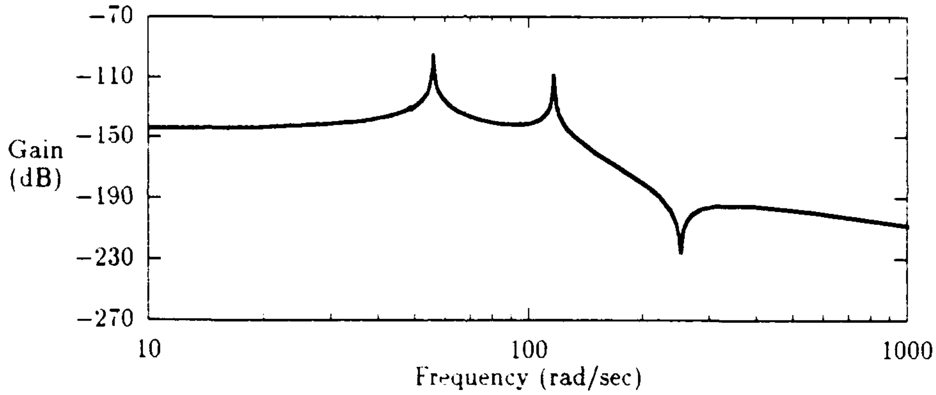

Figure C.116. 12-State Modal Reduced PMA 9 Y-axis Response

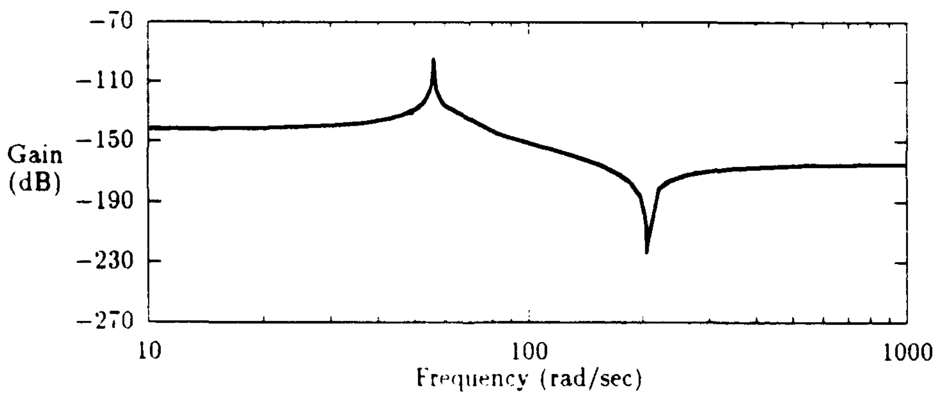

Figure C.117. 6-State Modal Reduced PMA 9 Y-axis Response

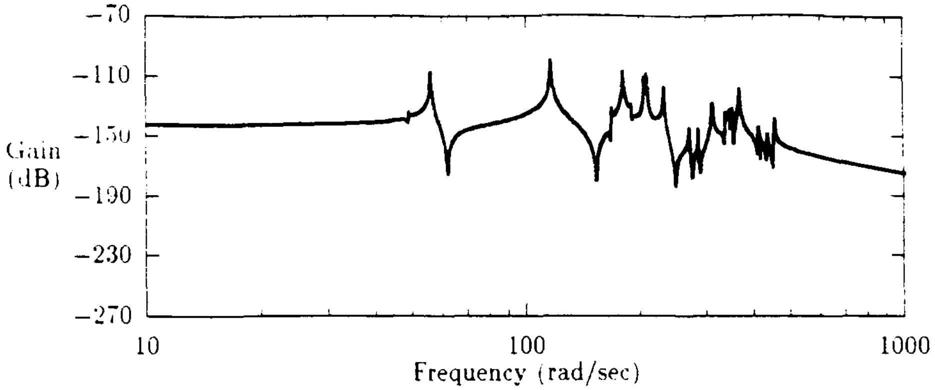

Figure C.118. Truth Model PMA 10 Y-axis Response

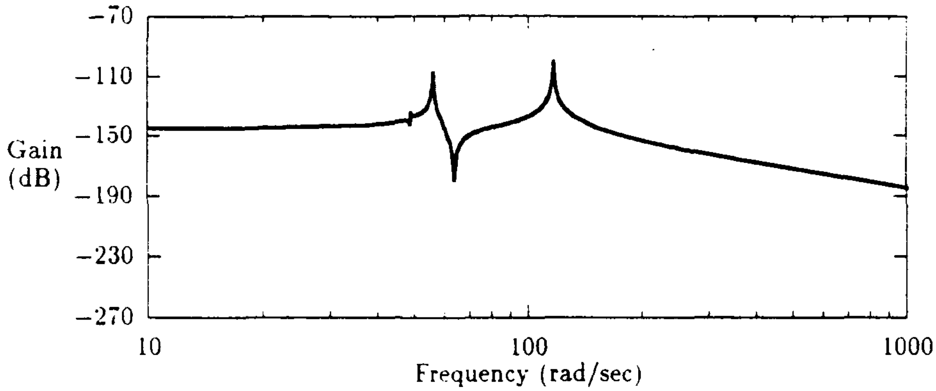

Figure C.119. 12-State Modal Reduced PMA 10 Y-axis Response

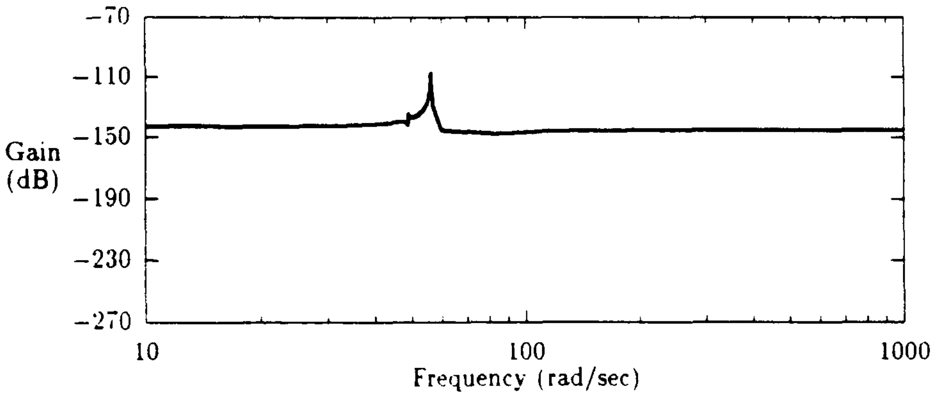

Figure C.120. 6-State Modal Reduced PMA 10 Y-axis Response

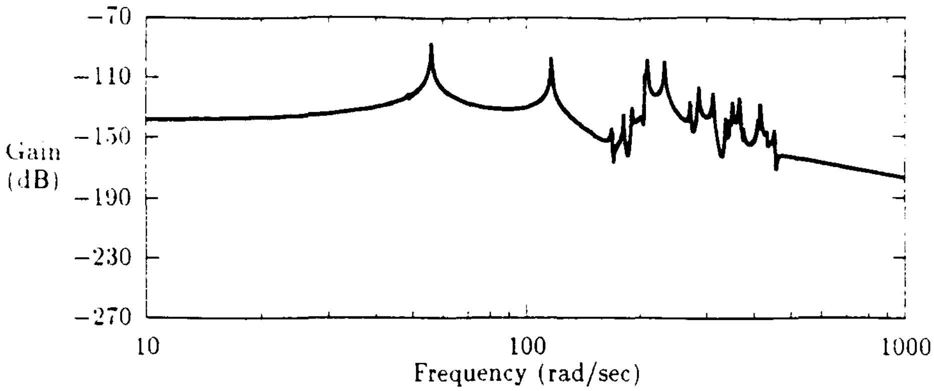

Figure C.121. Truth Model PMA 11 Y-axis Response

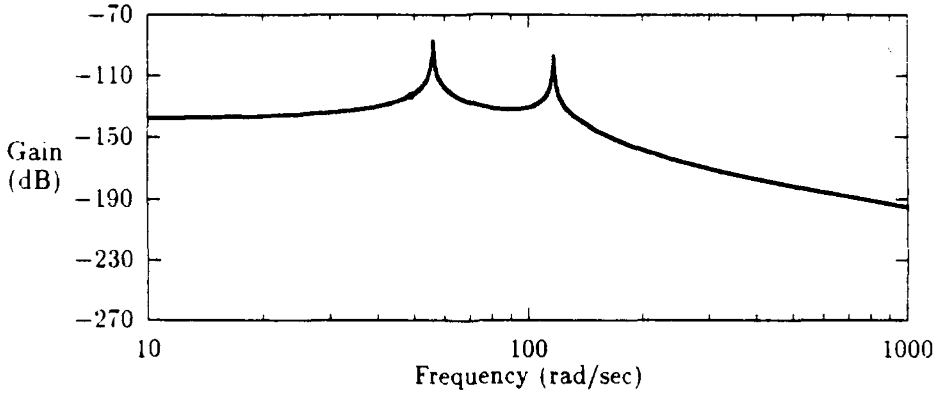

Figure C.122. 12-State Modal Reduced PMA 11 Y-axis Response

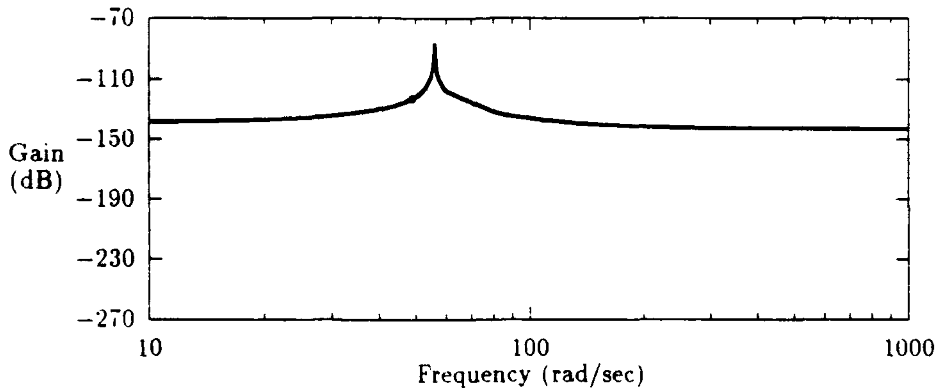

Figure C.123. 6-State Modal Reduced PMA 11 Y-axis Response

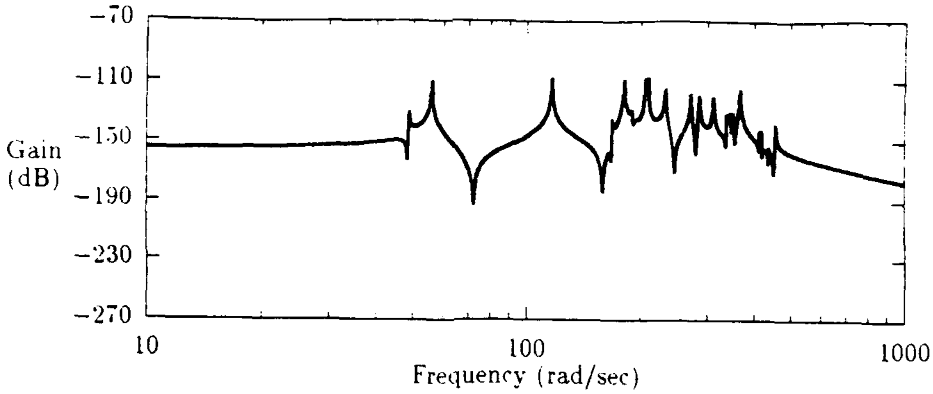

Figure C.124. Truth Model PMA 12 Y-axis Response

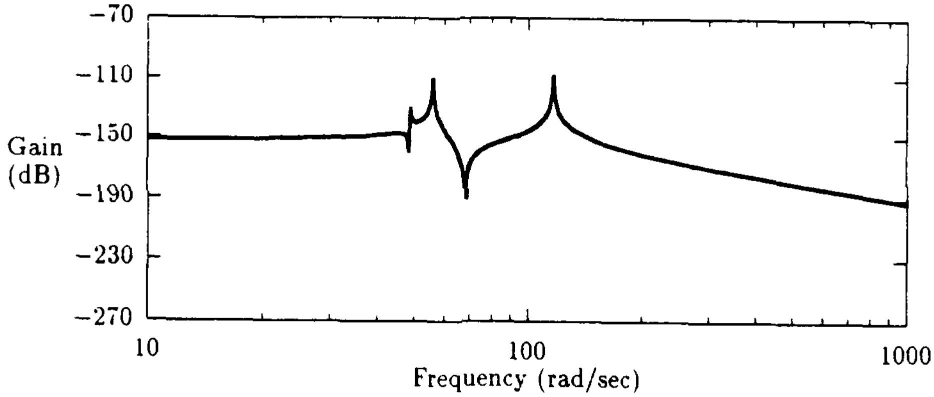

Figure C.125. 12-State Modal Reduced PMA 12 Y-axis Response

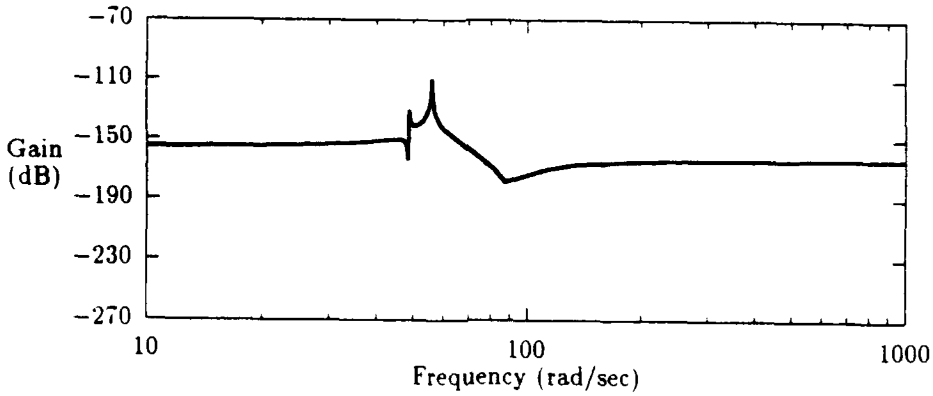

Figure C.126. 6-State Modal Reduced PMA 12 Y-axis Response

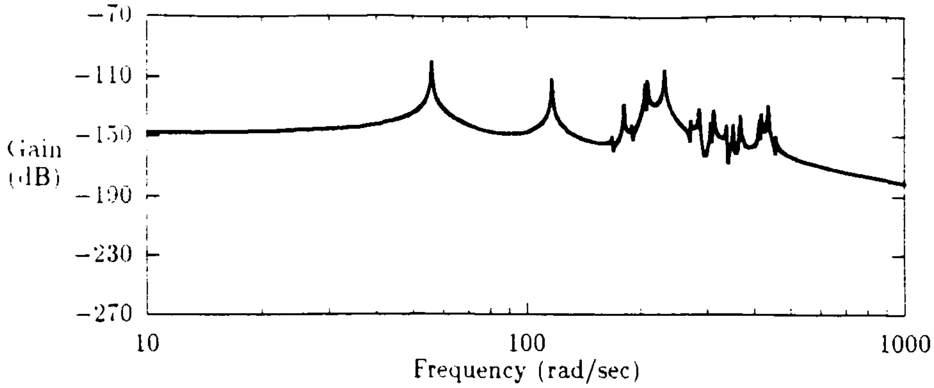

Figure C.127. Truth Model PMA 13 Y-axis Response

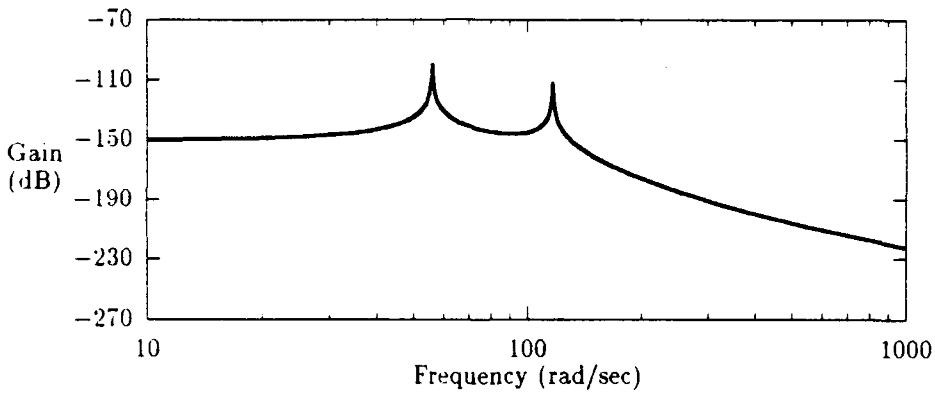

Figure C.128. 12-State Modal Reduced PMA 13 Y-axis Response

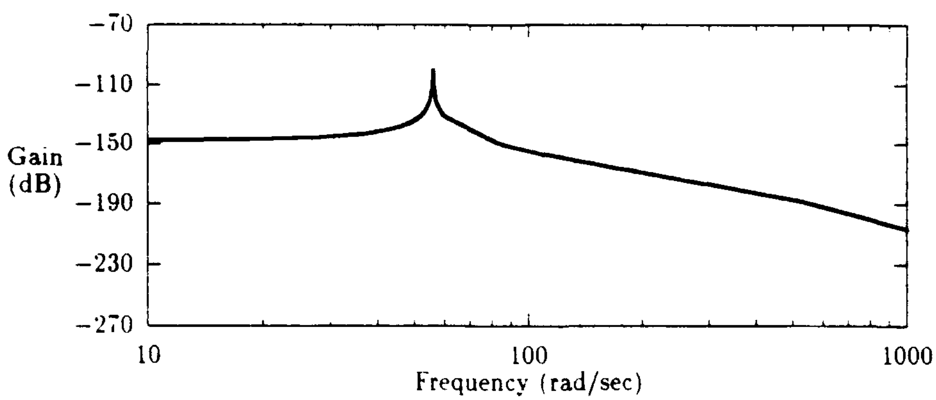

Figure C.129. 6-State Modal Reduced PMA 13 Y-axis Response

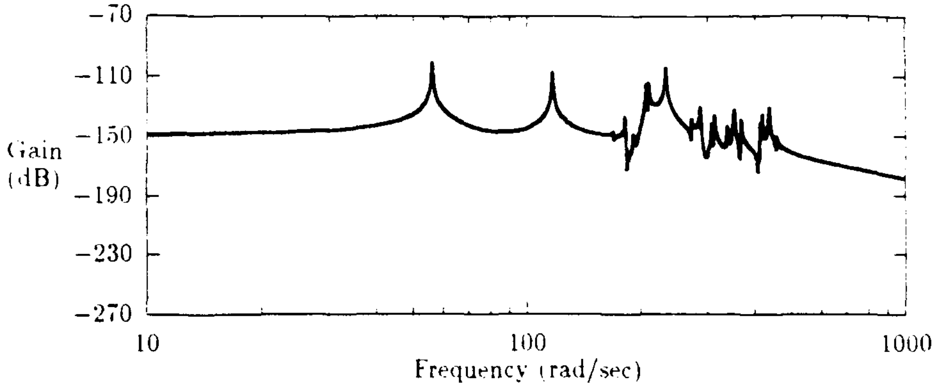

Figure C.130. Truth Model PMA 14 Y-axis Response

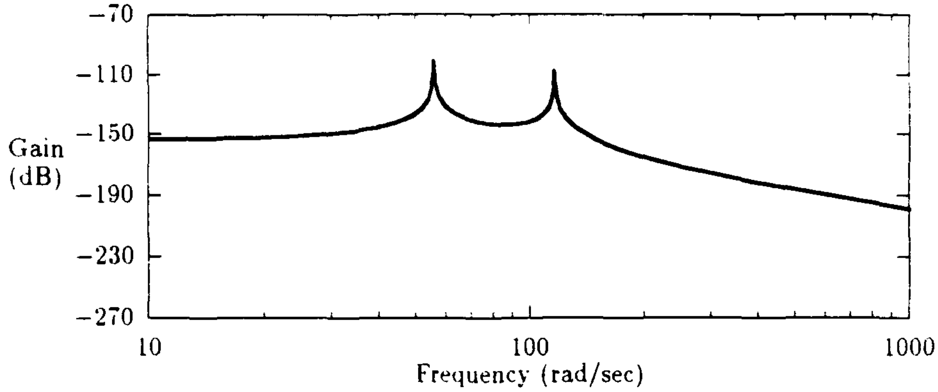

Figure C.131. 12-State Modal Reduced PMA 14 Y-axis Response

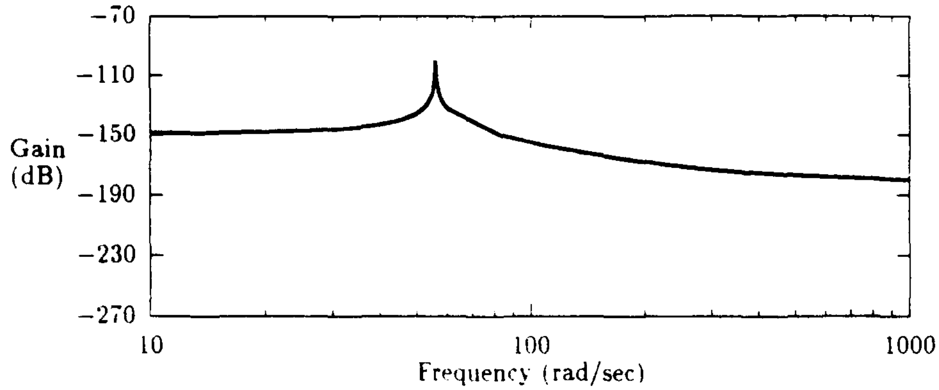

Figure C.132. 6-State Modal Reduced PMA 14 Y-axis Response

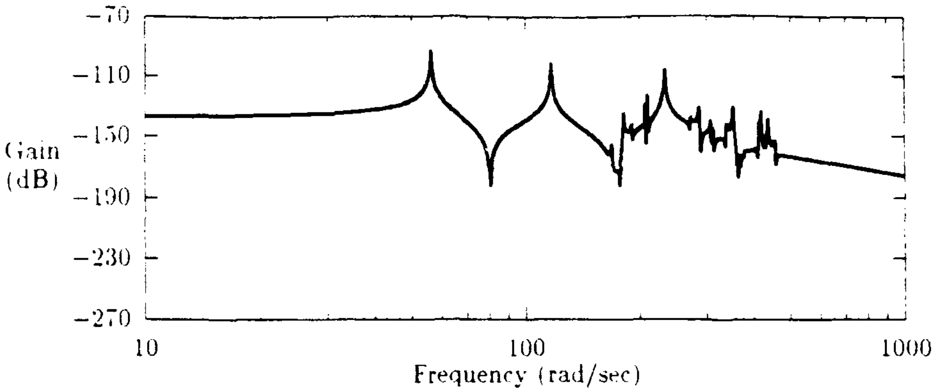

Figure C.133. Truth Model PMA 15 Y-axis Response

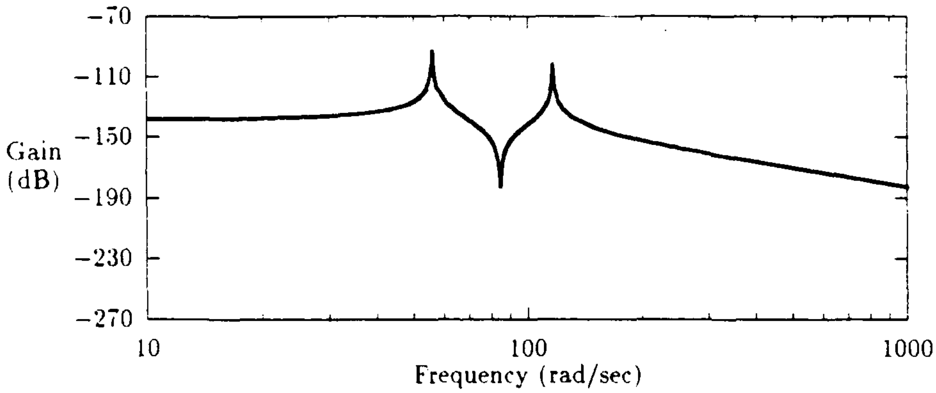

Figure C.134. 12-State Modal Reduced PMA 15 Y-axis Response

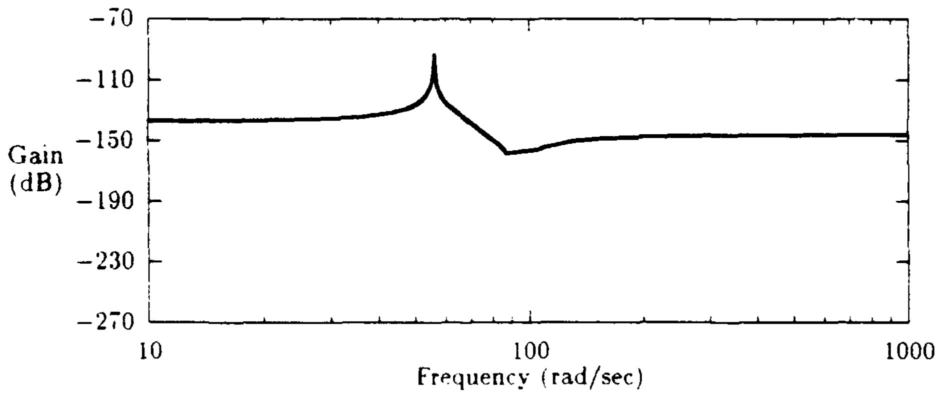

Figure C.135. 6-State Modal Reduced PMA 15 Y-axis Response

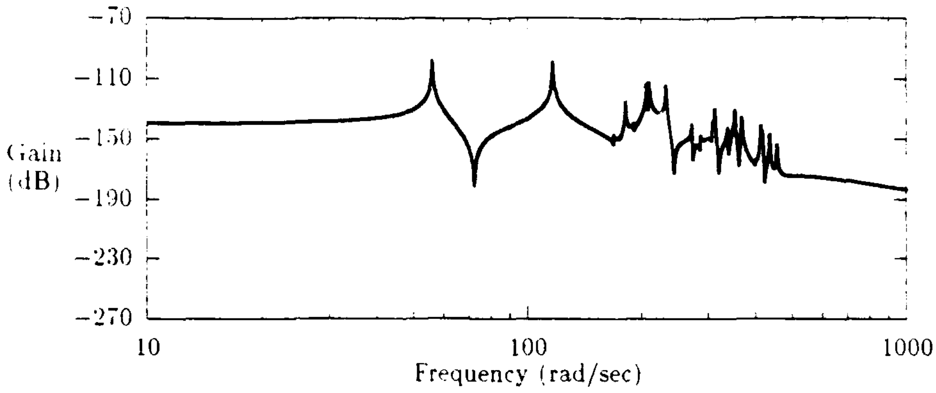

Figure C.136. Truth Model PMA 16 Y-axis Response

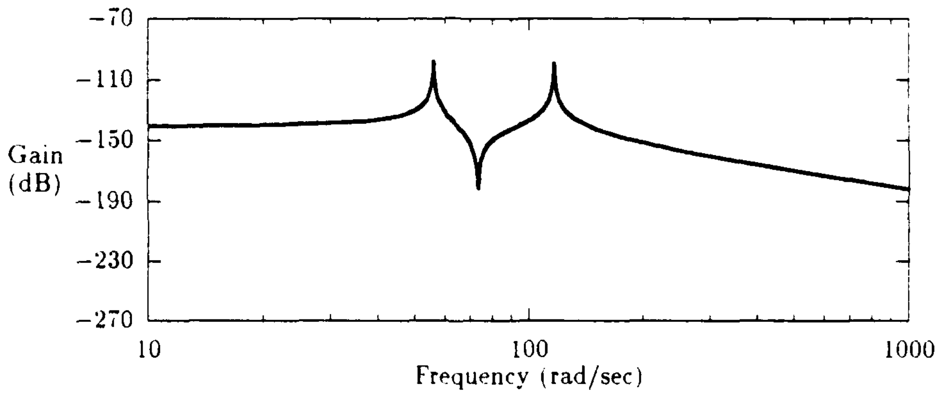

Figure C.137. 12-State Modal Reduced PMA 16 Y-axis Response

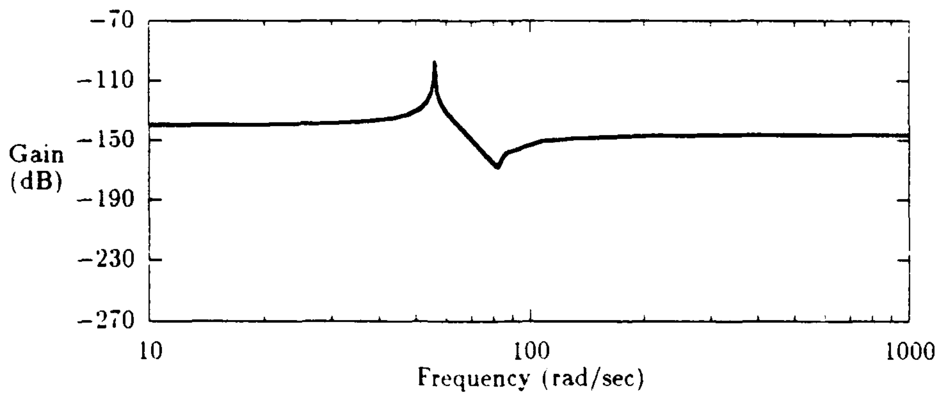

Figure C.138. 6-State Modal Reduced PMA 16 Y-axis Response

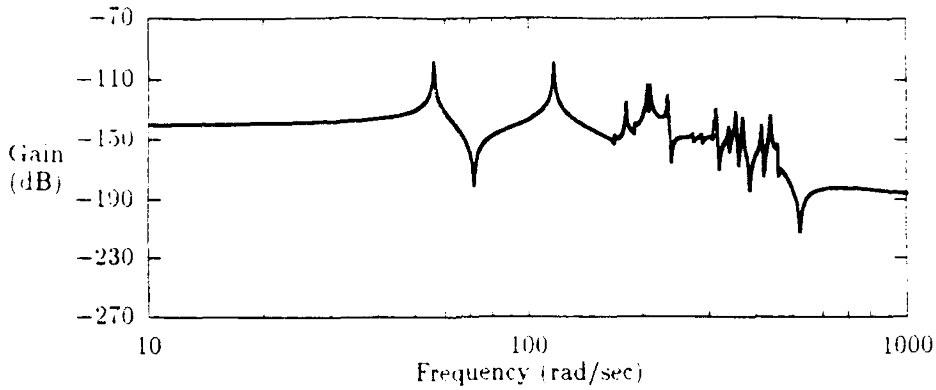

Figure C.139. Truth Model PMA 17 Y-axis Response

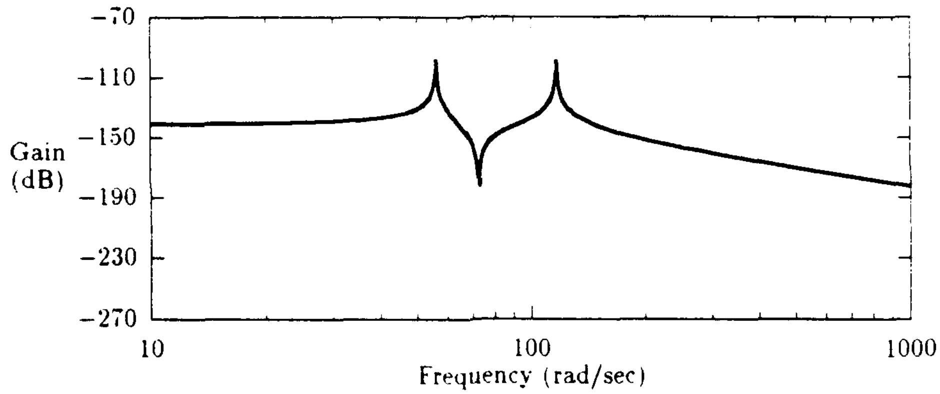

Figure C.140. 12-State Modal Reduced PMA 17 Y-axis Response

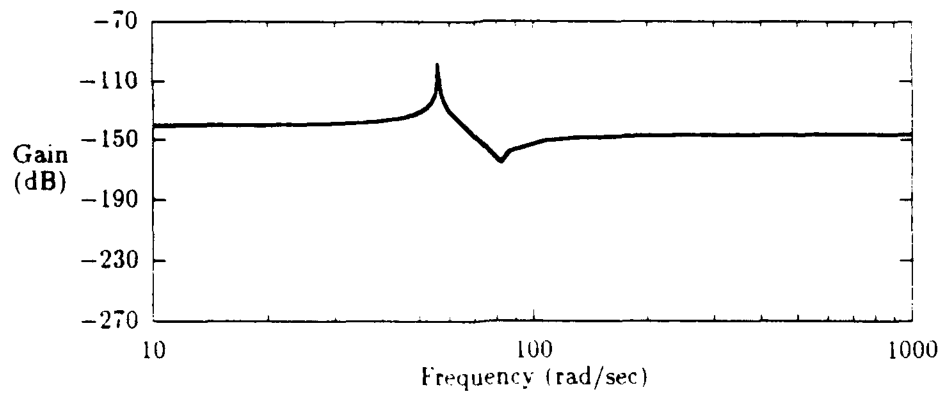

Figure C.141. 6-State Modal Reduced PMA 17 Y-axis Response

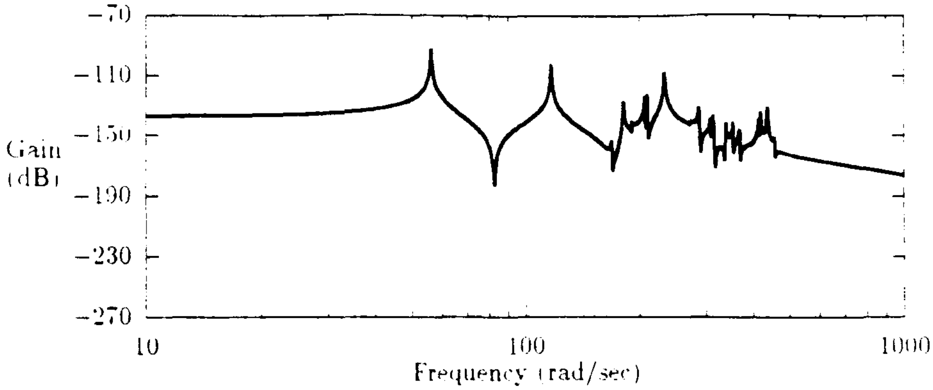

Figure C.142. Truth Model PMA 18 Y-axis Response

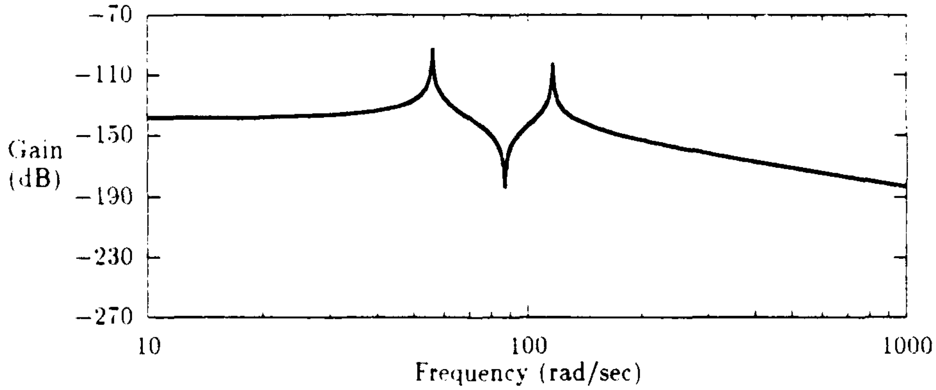

Figure C.143. 12-State Modal Reduced PMA 18 Y-axis Response

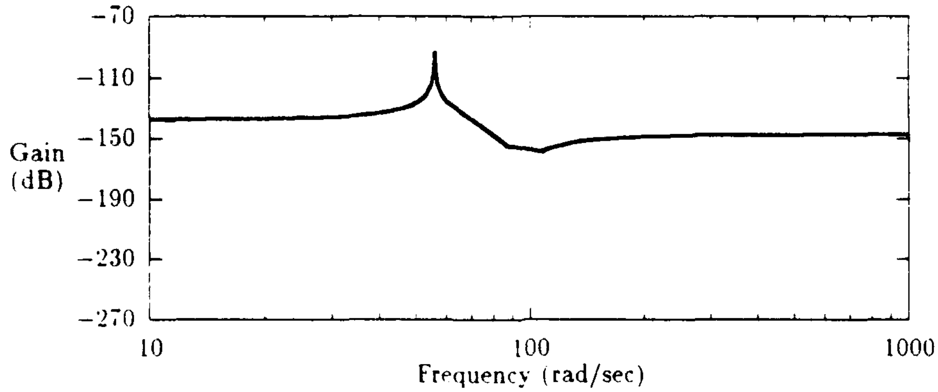

Figure C.144. 6-State Modal Reduced PMA 18 Y-axis Response

Appendix D. *SPICE Internally Balanced Models Open-loop Bode Responses*

This appendix contains the Bode amplitude rate plots for the three internally balanced reduced-order models developed in Section 3.6.2.

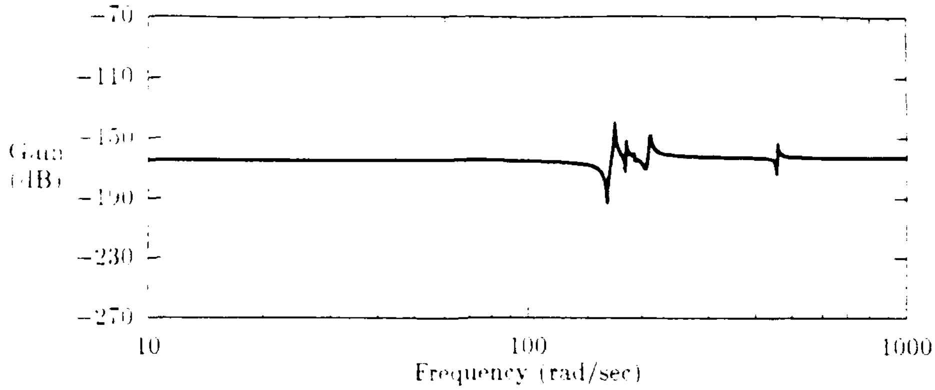

Figure D.1. 14-State Internally Balanced Disturbance 1 X-axis Response

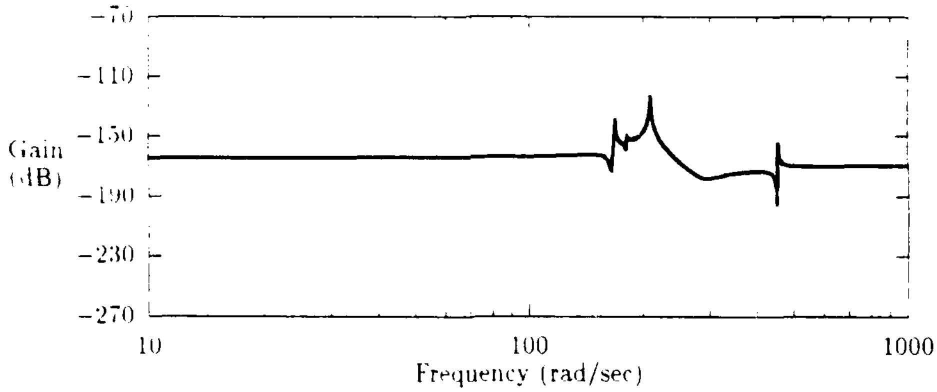

Figure D.2. 12-State Internally Balanced Disturbance 1 X-axis Response

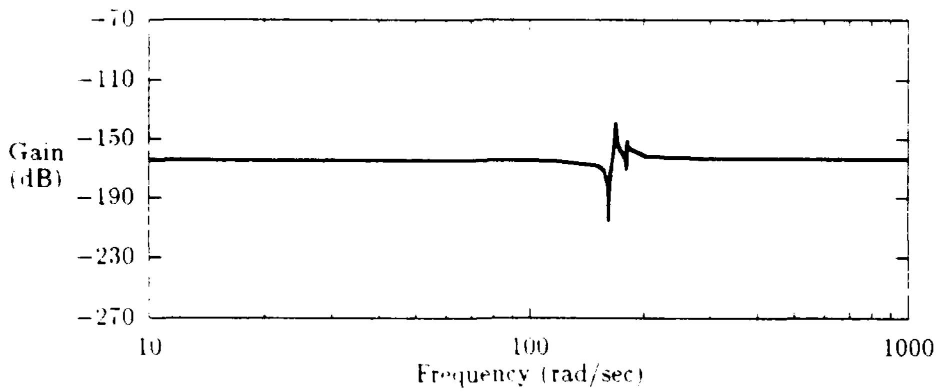

Figure D.3. 6-State Internally Balanced Disturbance 1 X-axis Response

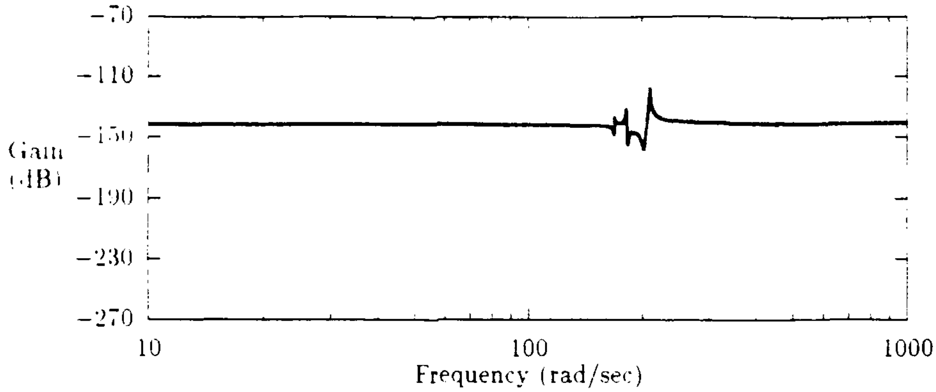

Figure D.4. 14-State Internally Balanced Disturbance 2 X-axis Response

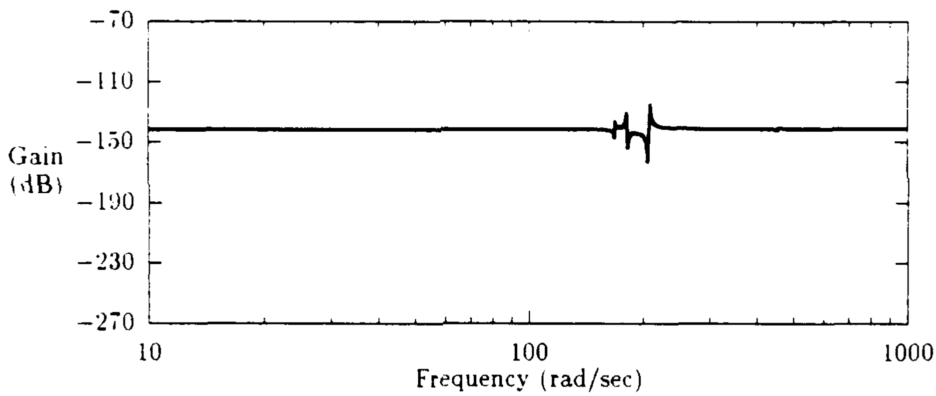

Figure D.5. 12-State Internally Balanced Disturbance 2 X-axis Response

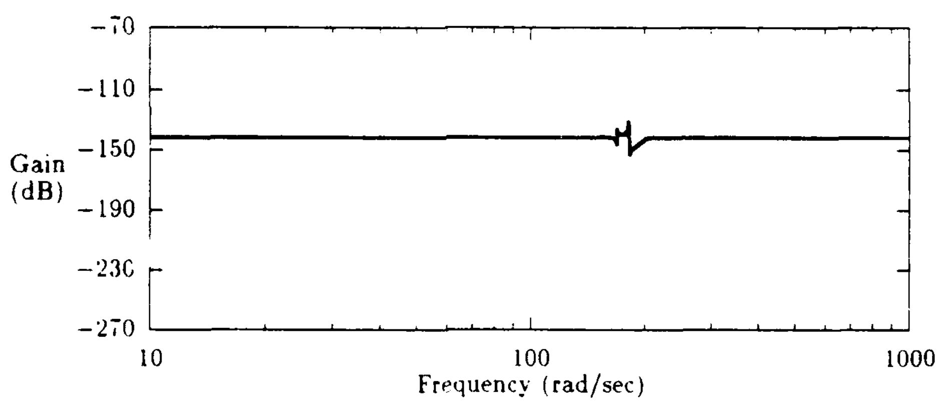

Figure D.6. 6-State Internally Balanced Disturbance 2 X-axis Response

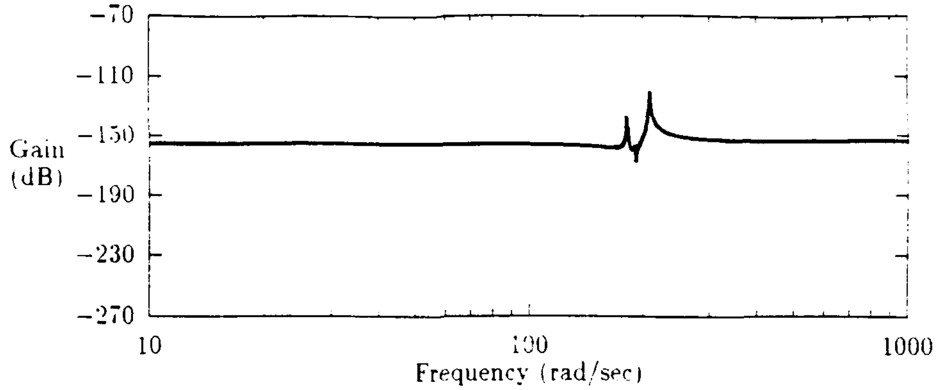

Figure D.7. 14-State Internally Balanced Disturbance 3 X-axis Response

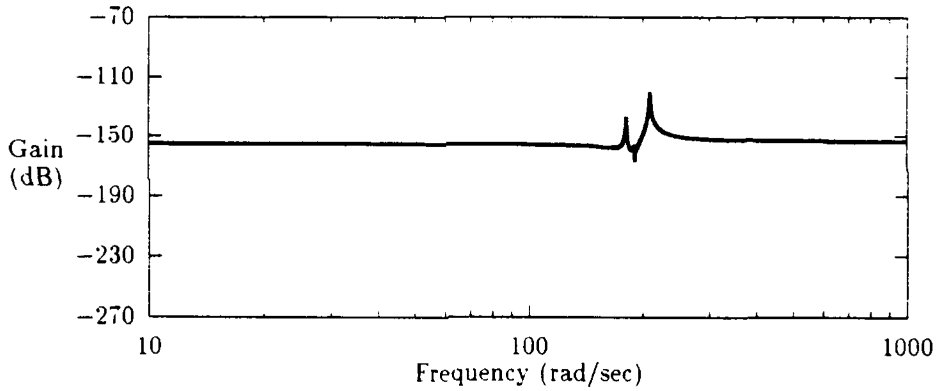

Figure D.8. 12-State Internally Balanced Disturbance 3 X-axis Response

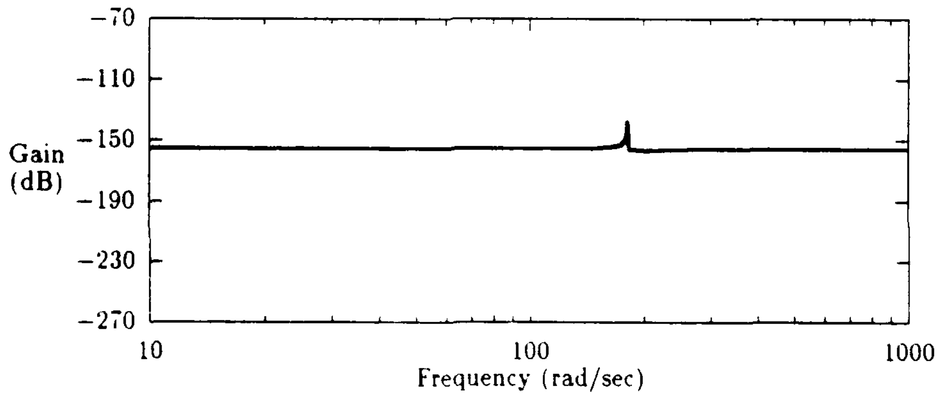

Figure D.9. 6-State Internally Balanced Disturbance 3 X-axis Response

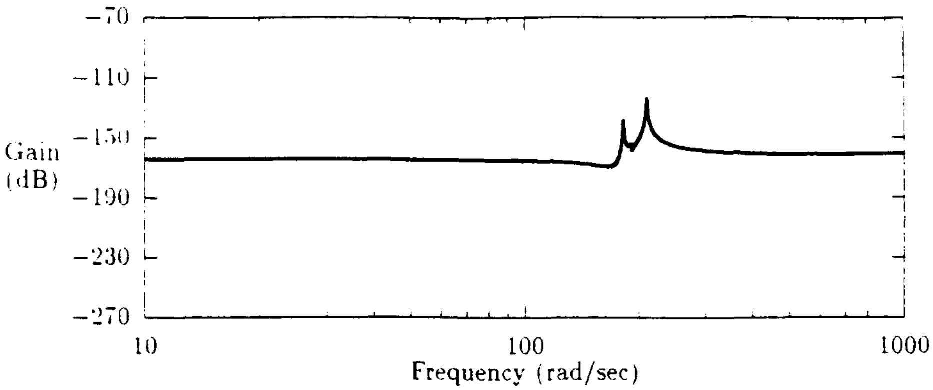

Figure D.10. 14-State Internally Balanced Disturbance 4 X-axis Response

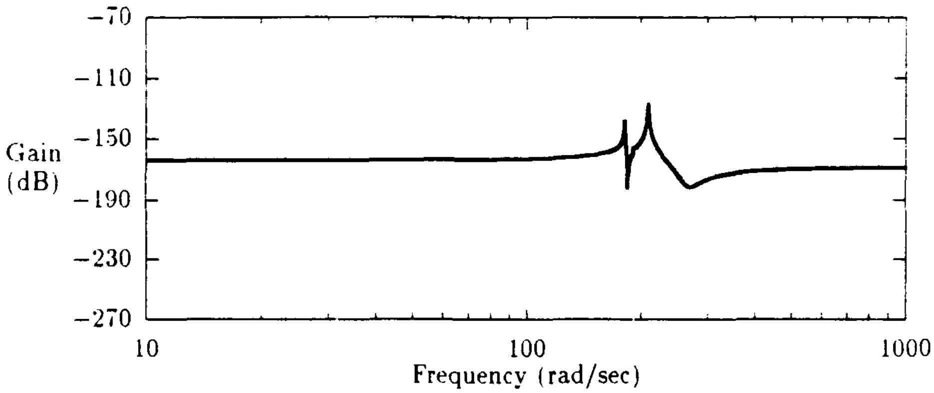

Figure D.11. 12-State Internally Balanced Disturbance 4 X-axis Response

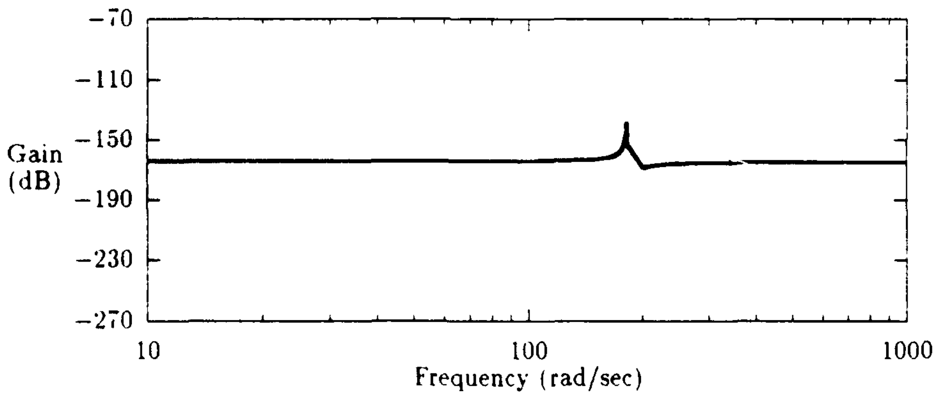

Figure D.12. 6-State Internally Balanced Disturbance 4 X-axis Response

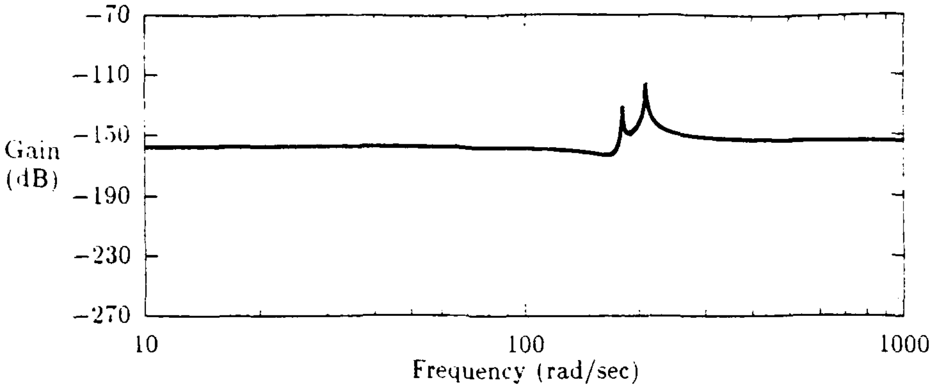

Figure D.13 14-State Internally Balanced Disturbance 5 X-axis Response

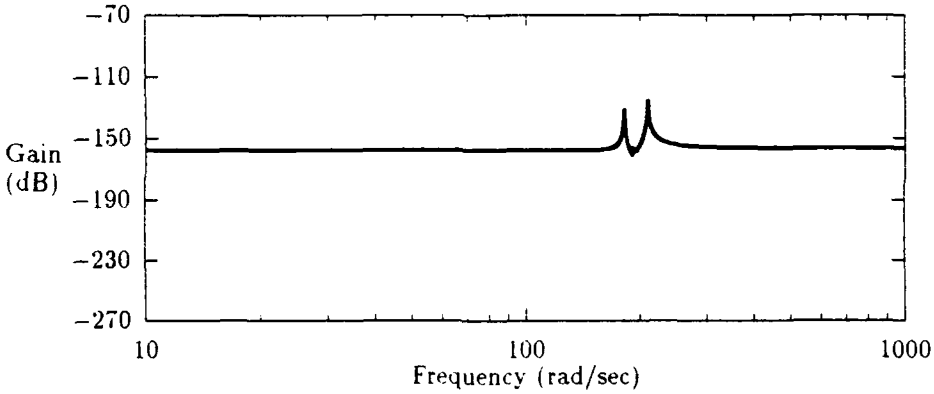

Figure D.14. 12-State Internally Balanced Disturbance 5 X-axis Response

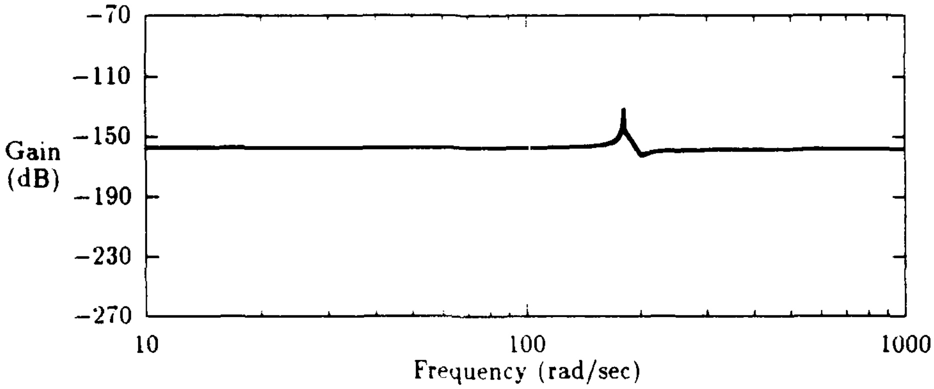

Figure D.15. 6-State Internally Balanced Disturbance 5 X-axis Response

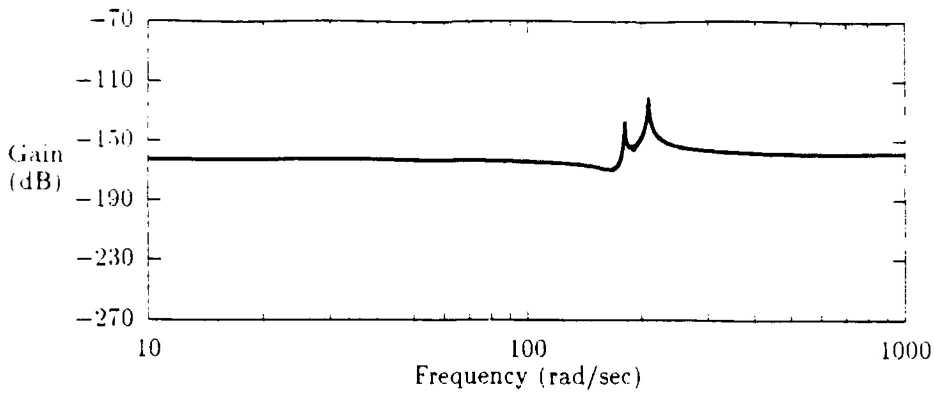

Figure D.16. 14-State Internally Balanced Disturbance 6 X-axis Response

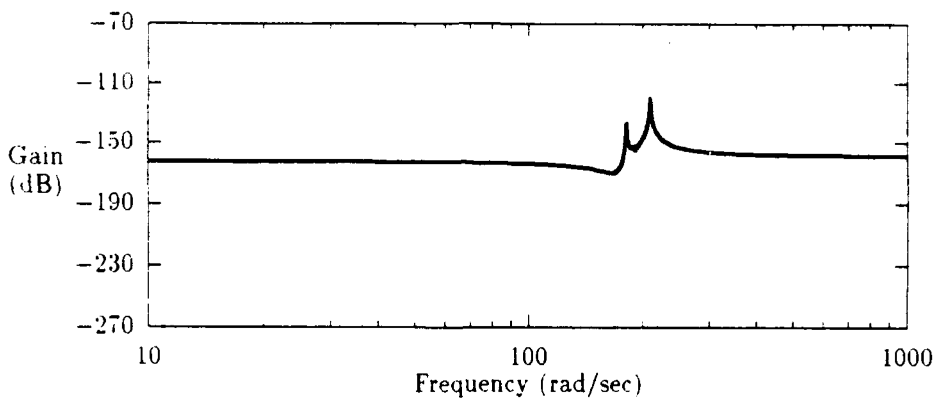

Figure D.17. 12-State Internally Balanced Disturbance 6 X-axis Response

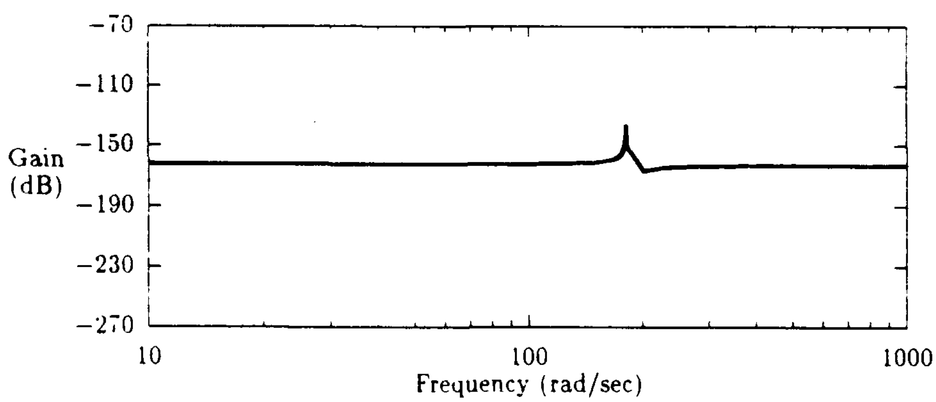

Figure D.18. 6-State Internally Balanced Disturbance 6 X-axis Response

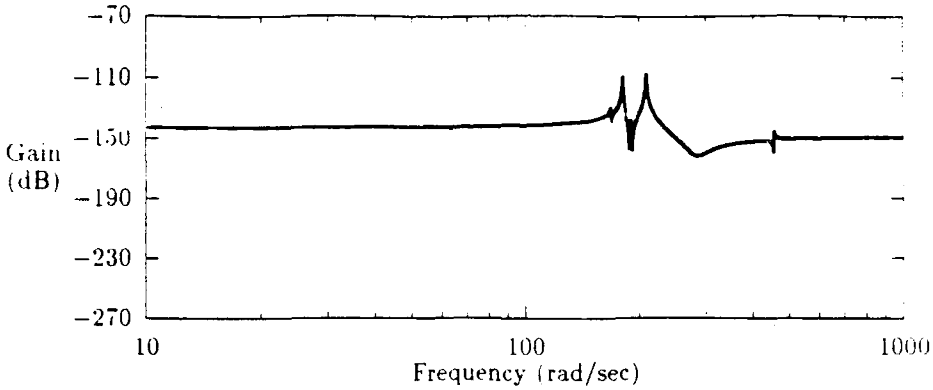

Figure D.19. 14-State Internally Balanced Disturbance 1 Y-axis Response

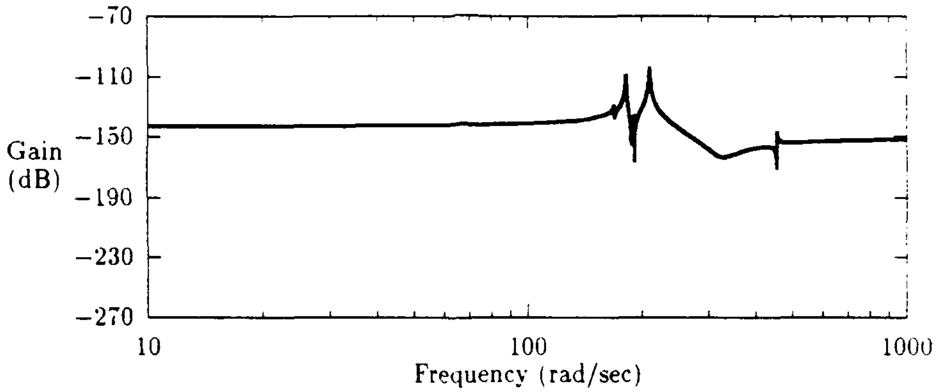

Figure D.20. 12-State Internally Balanced Disturbance 1 Y-axis Response

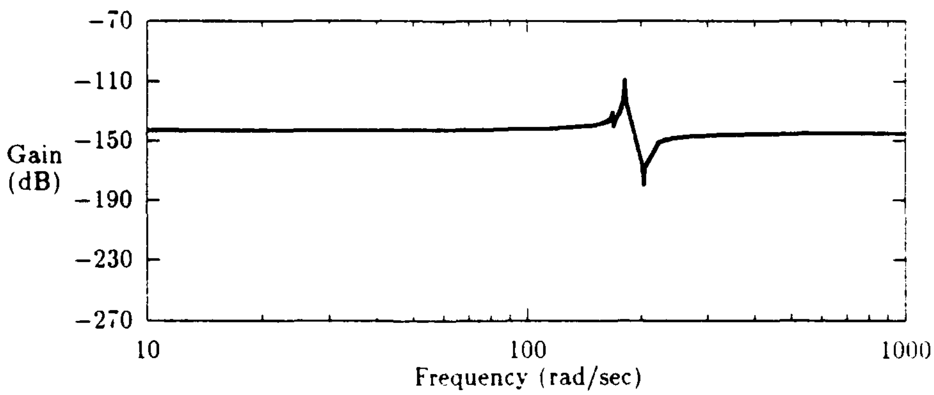

Figure D.21. 6-State Internally Balanced Disturbance 1 Y-axis Response

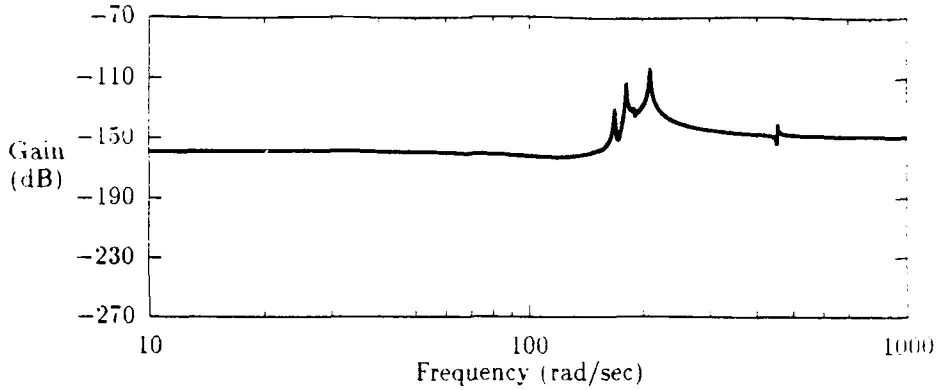

Figure D.22. 14-State Internally Balanced Disturbance 2 Y-axis Response

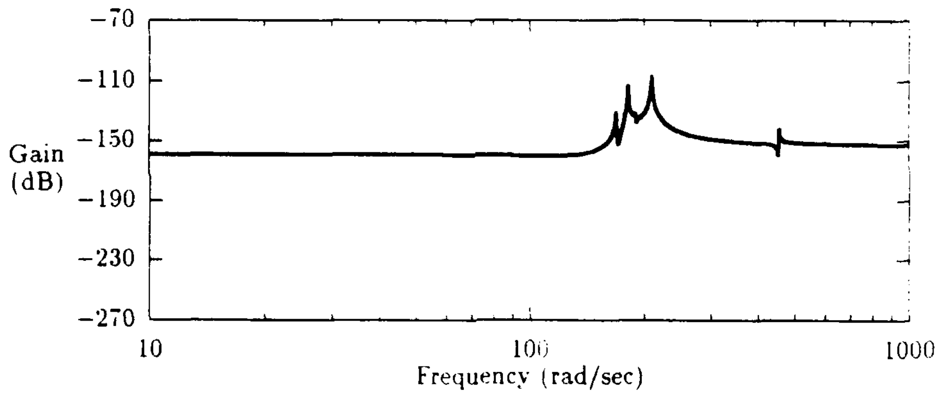

Figure D.23. 12-State Internally Balanced Disturbance 2 Y-axis Response

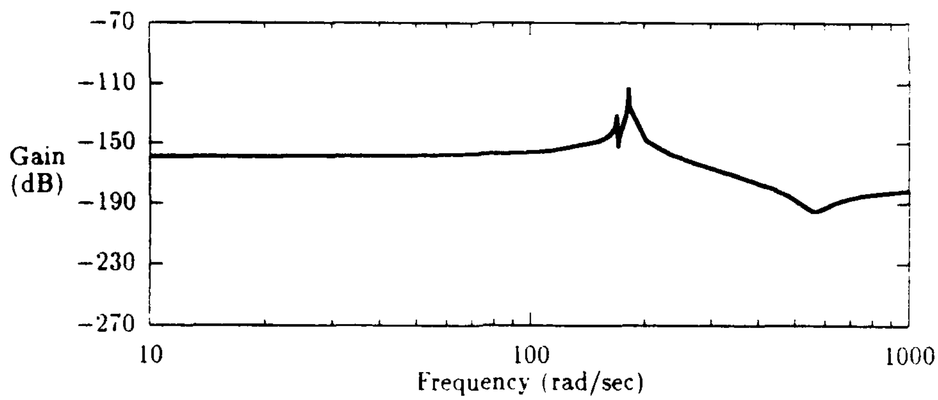

Figure D.24. 6-State Internally Balanced Disturbance 2 Y-axis Response

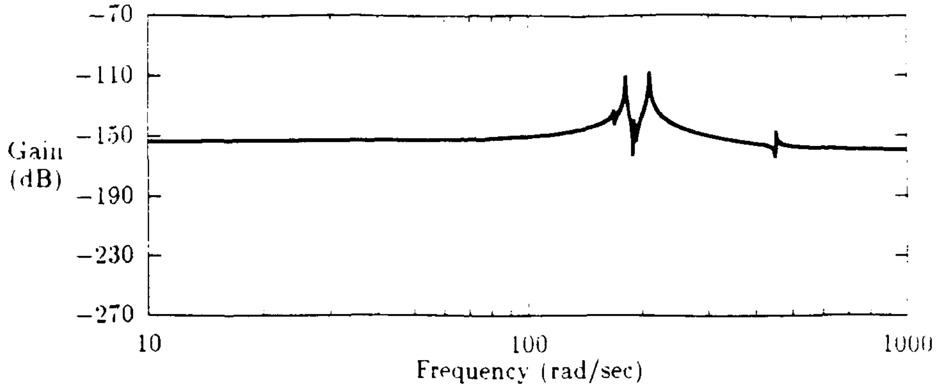

Figure D.25. 14-State Internally Balanced Disturbance 3 Y-axis Response

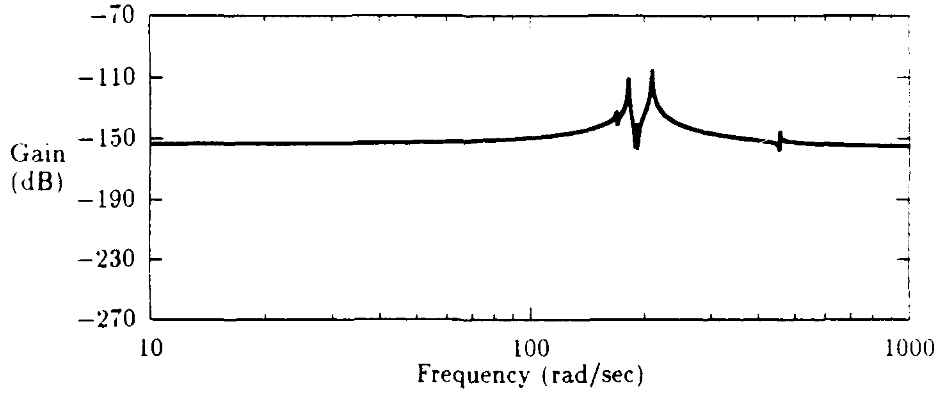

Figure D.26. 12-State Internally Balanced Disturbance 3 Y-axis Response

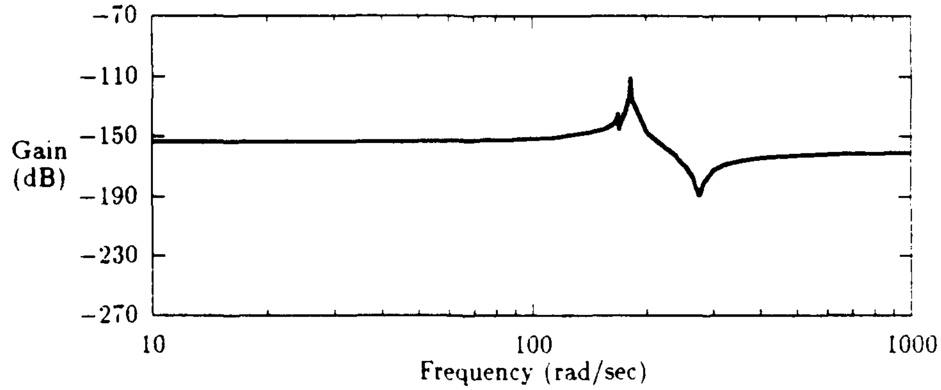

Figure D.27. 6-State Internally Balanced Disturbance 3 Y-axis Response

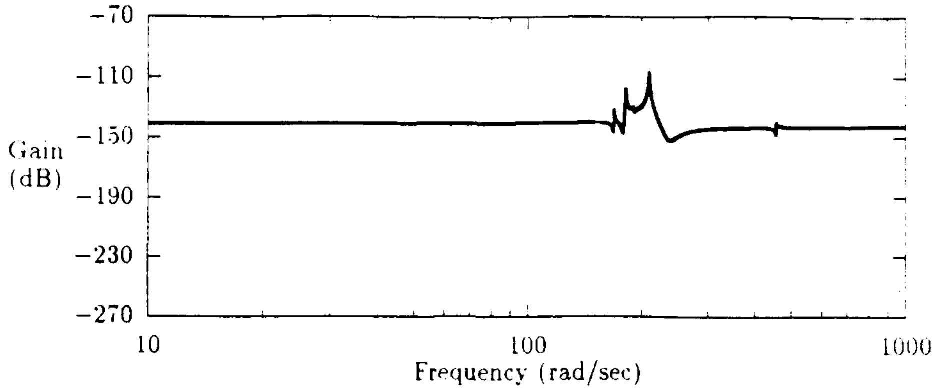

Figure D.28. 14-State Internally Balanced Disturbance 4 Y-axis Response

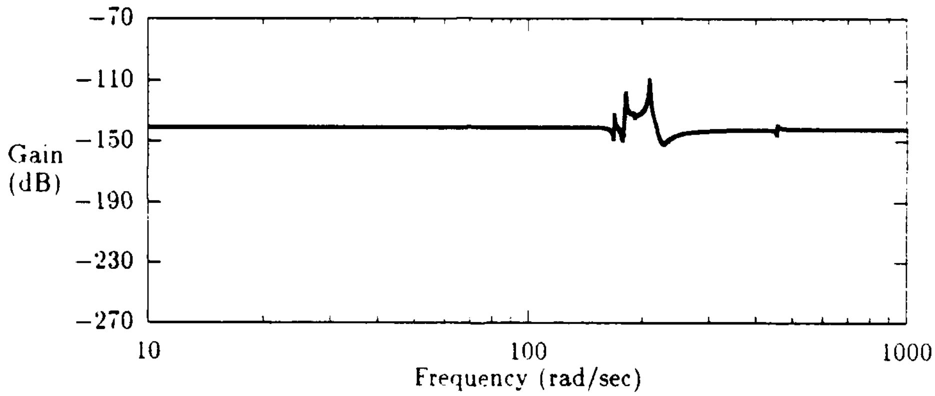

Figure D.29. 12-State Internally Balanced Disturbance 4 Y-axis Response

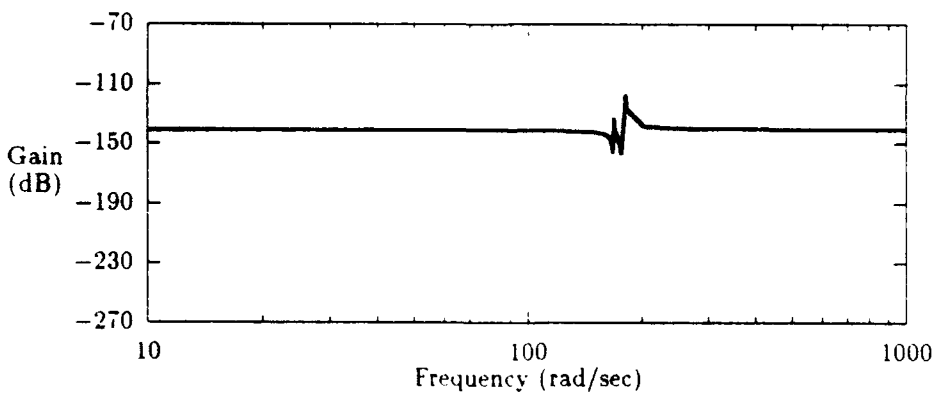

Figure D.30. 6-State Internally Balanced Disturbance 4 Y-axis Response

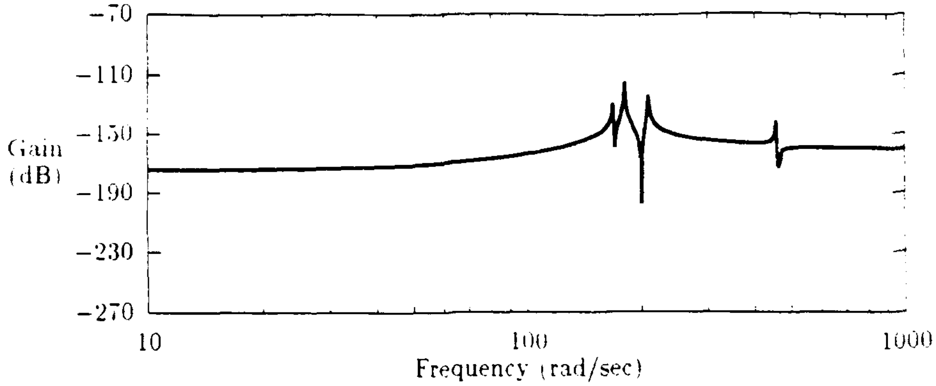

Figure D.31. 14-State Internally Balanced Disturbance 5 Y-axis Response

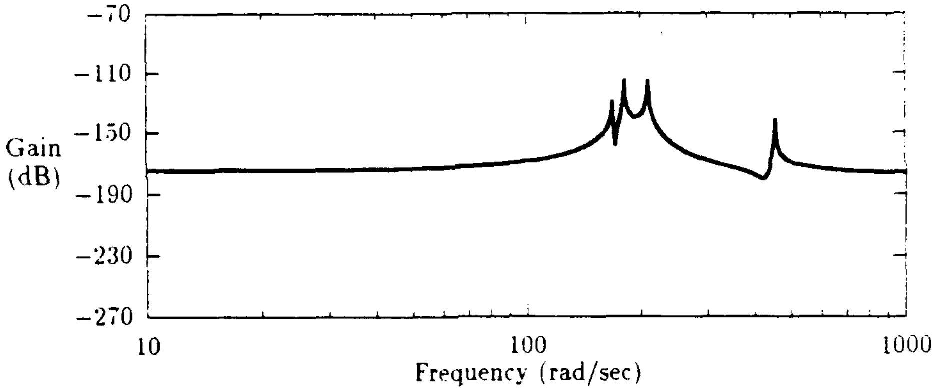

Figure D.32. 12-State Internally Balanced Disturbance 5 Y-axis Response

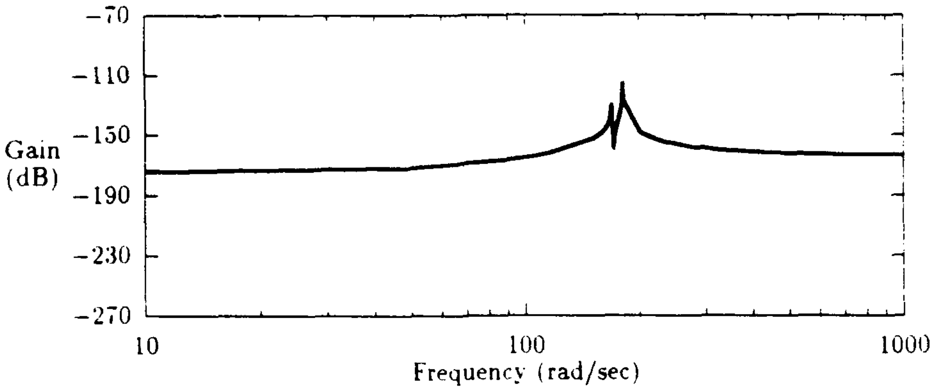

Figure D.33. 6-State Internally Balanced Disturbance 5 Y-axis Response

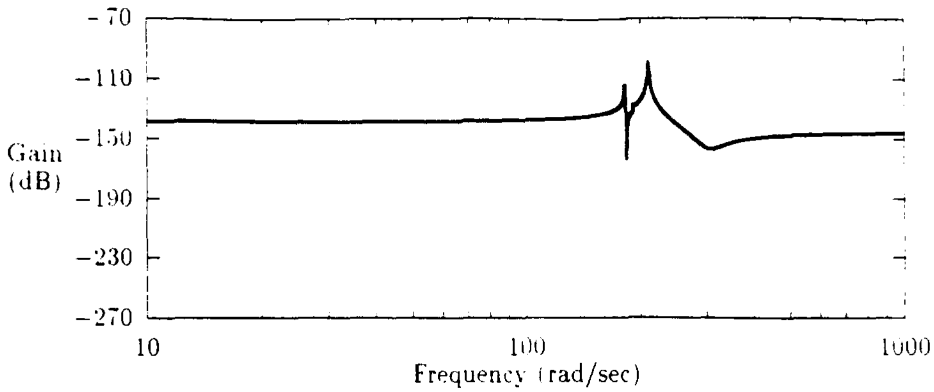

Figure D.34. 14-State Internally Balanced Disturbance 6 Y-axis Response

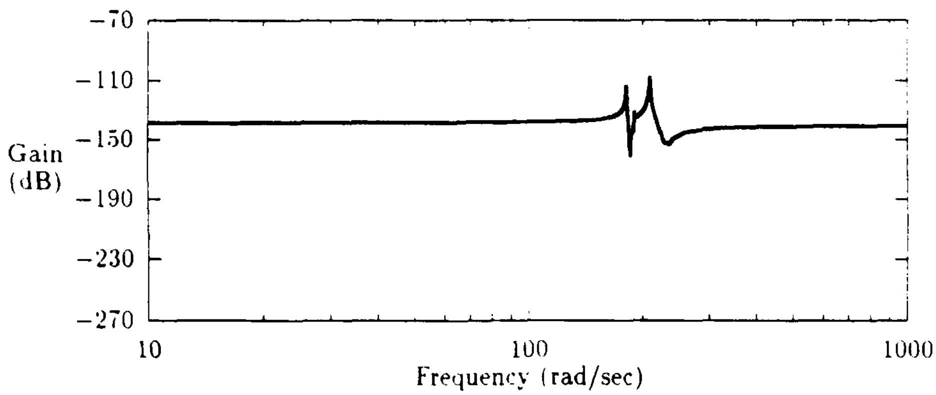

Figure D.35. 12-State Internally Balanced Disturbance 6 Y-axis Response

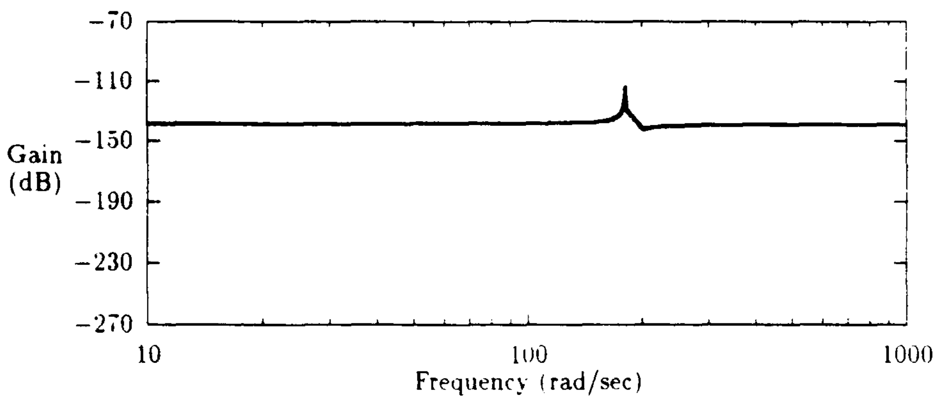

Figure D.36. 6-State Internally Balanced Disturbance 6 Y-axis Response

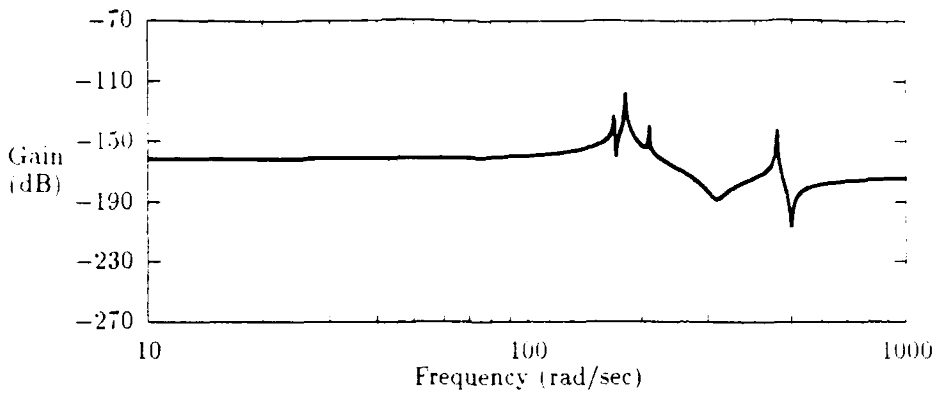

Figure D.37. 14-State Internally Balanced PMA 1 X-axis Response

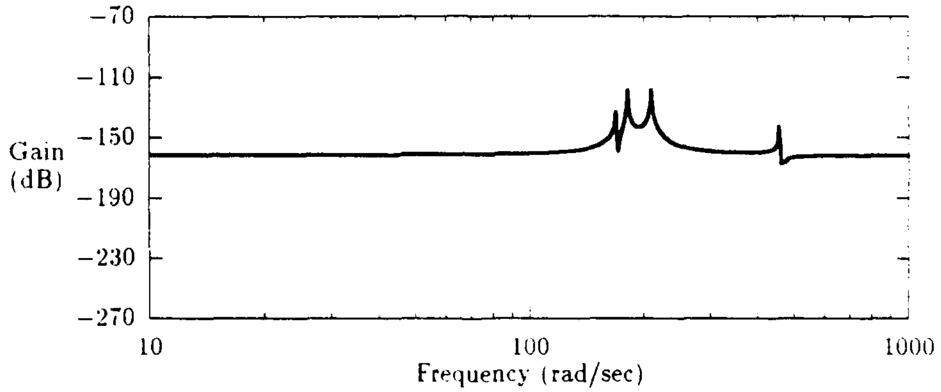

Figure D.38. 12-State Internally Balanced PMA 1 X-axis Response

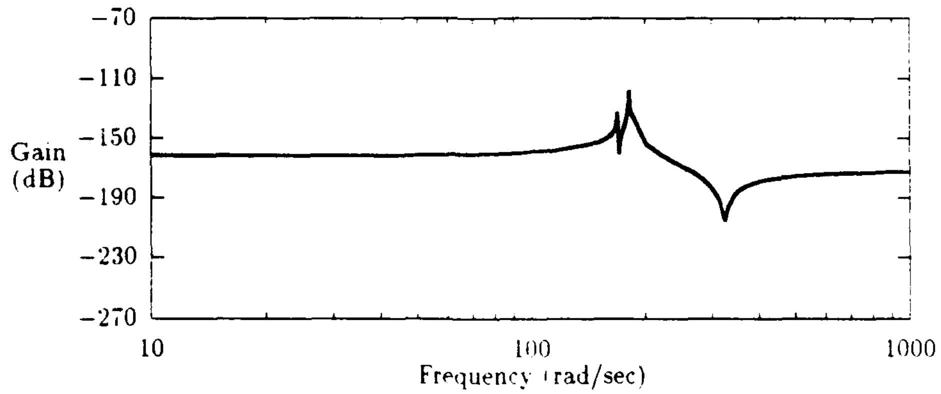

Figure D.39. 6-State Internally Balanced PMA 1 X-axis Response

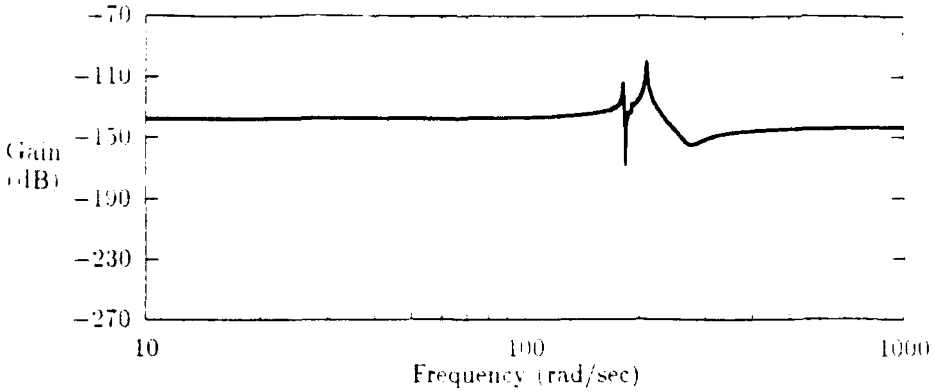

Figure D.40. 14-State Internally Balanced PMA 2 X-axis Response

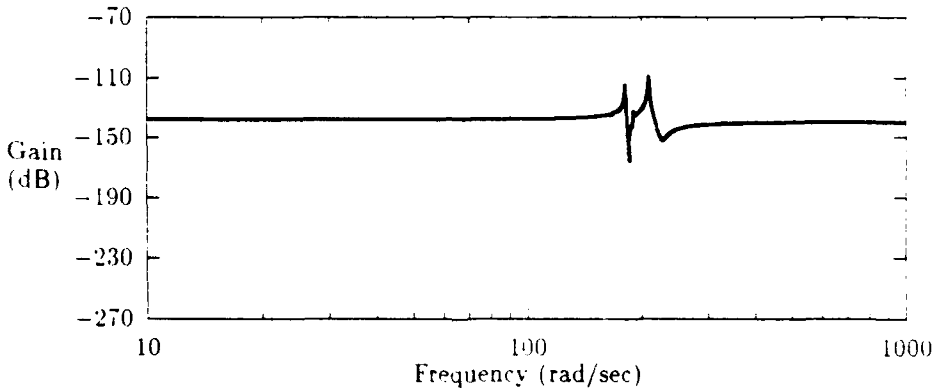

Figure D.41. 12-State Internally Balanced PMA 2 X-axis Response

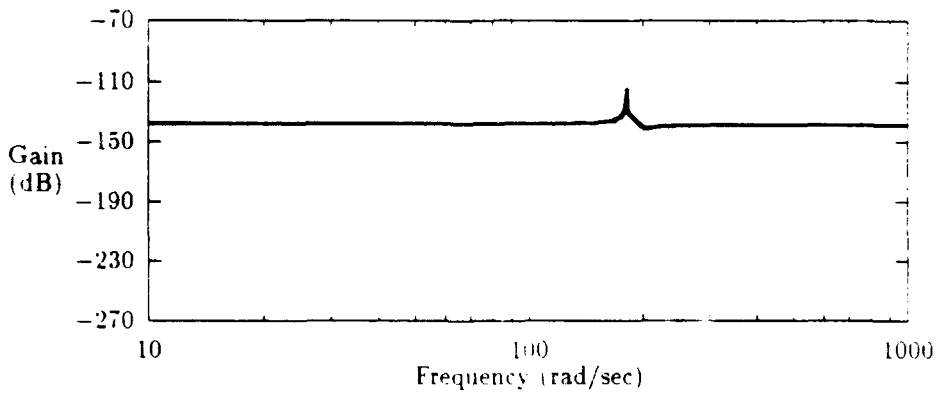

Figure D.42. 6-State Internally Balanced PMA 2 X-axis Response

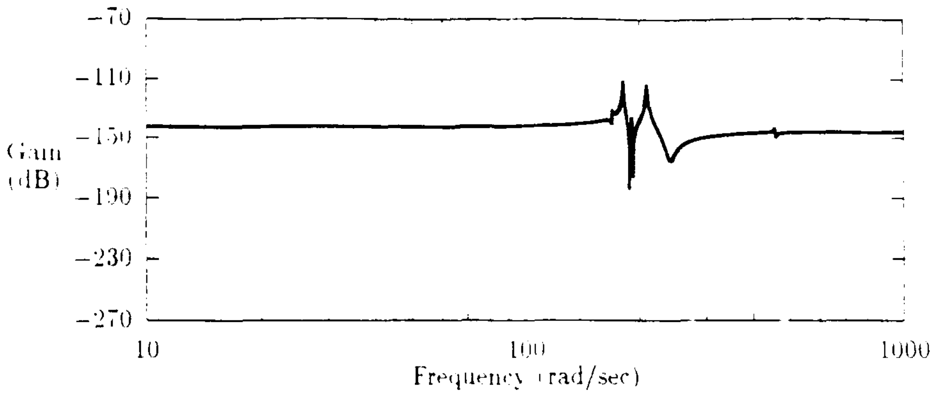

Figure D.43. 14-State Internally Balanced PMA 3 X-axis Response

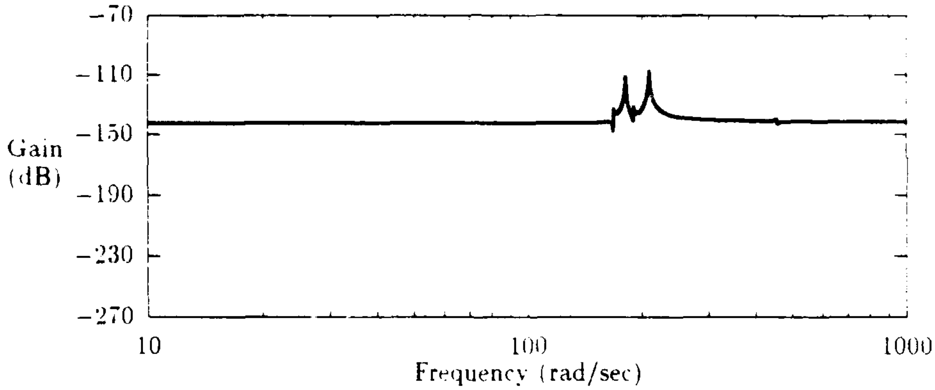

Figure D.44. 12-State Internally Balanced PMA 3 X-axis Response

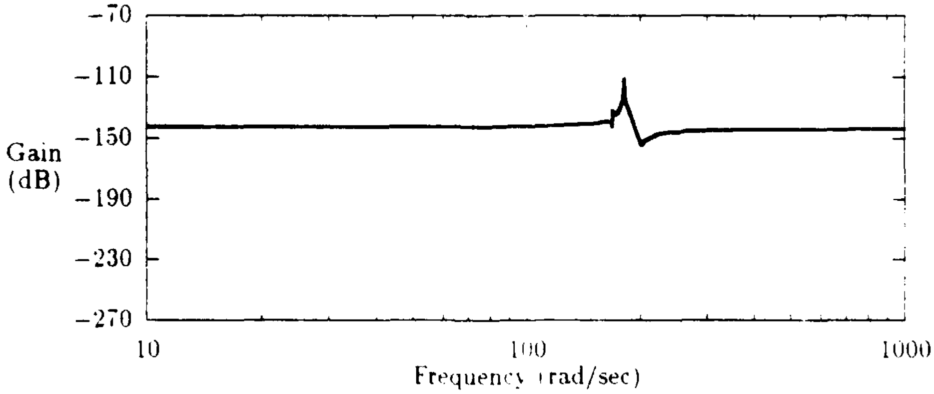

Figure D.45. 6-State Internally Balanced PMA 3 X-axis Response

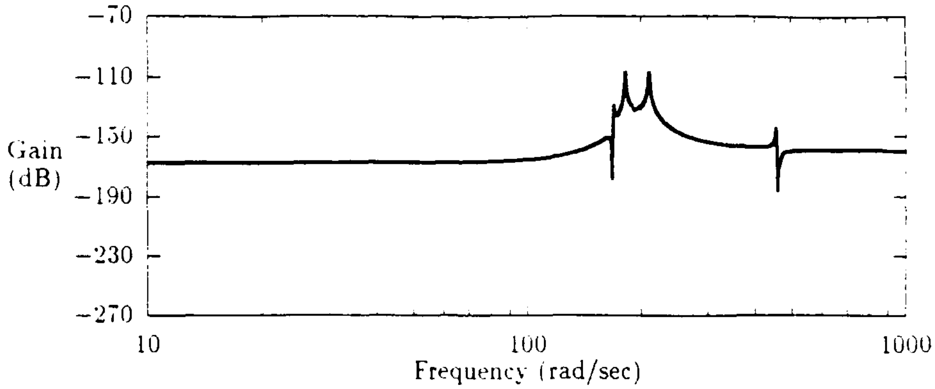

Figure D.46. 14-State Internally Balanced PMA 4 X-axis Response

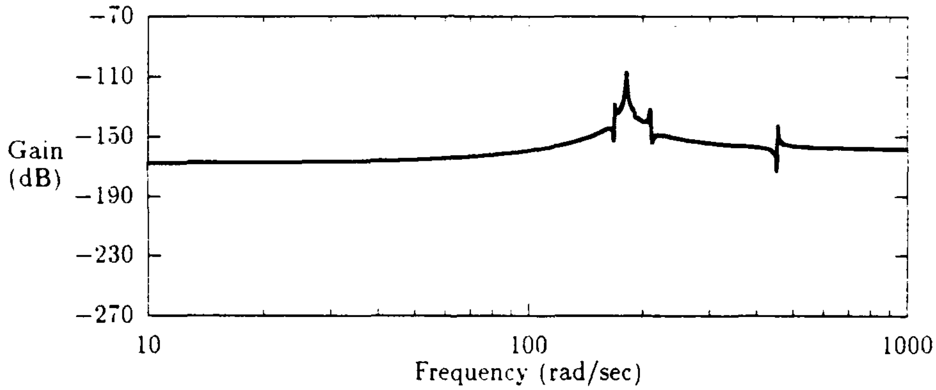

Figure D.47. 12-State Internally Balanced PMA 4 X-axis Response

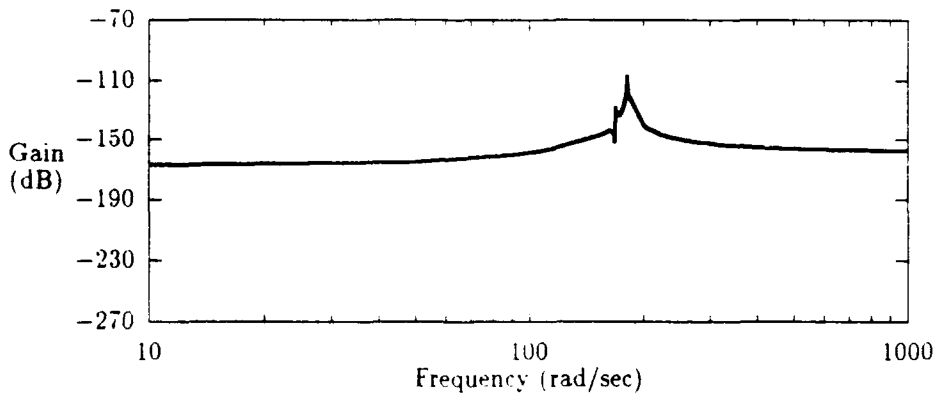

Figure D.48. 6-State Internally Balanced PMA 4 X-axis Response

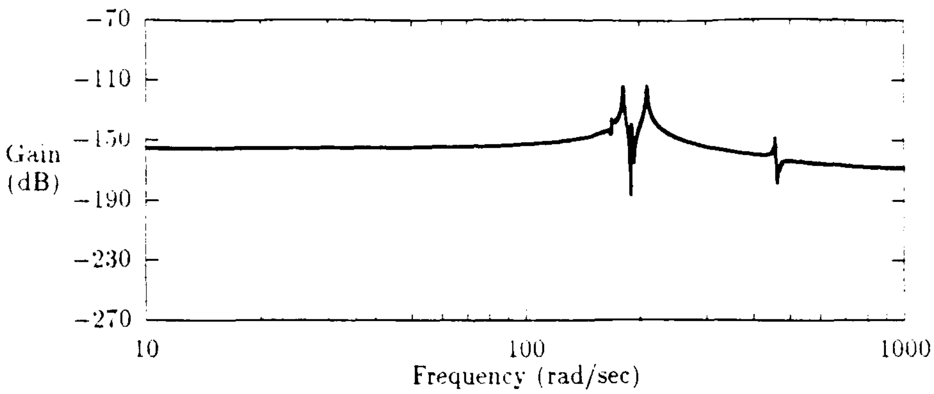

Figure D.49. 14-State Internally Balanced PMA 5 X-axis Response

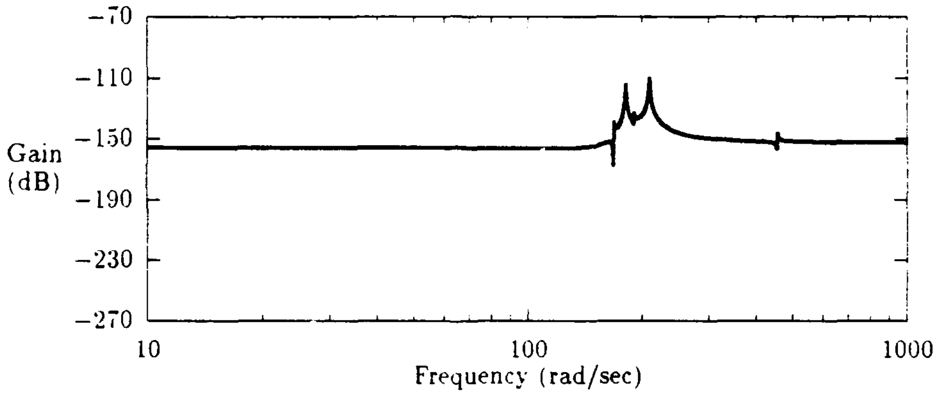

Figure D.50. 12-State Internally Balanced PMA 5 X-axis Response

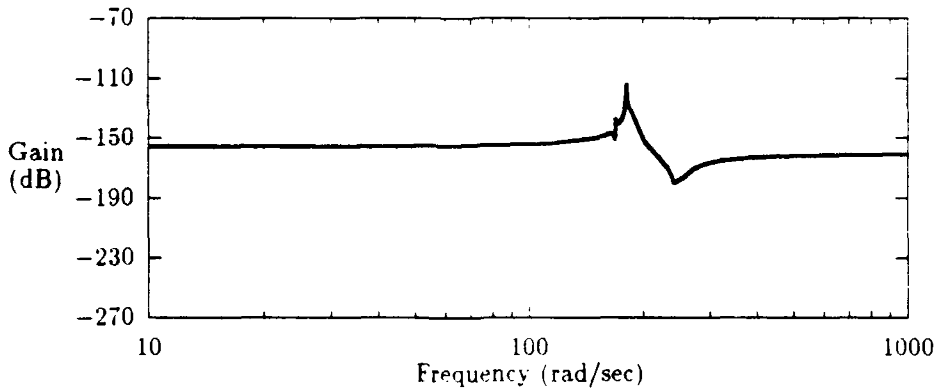

Figure D.51. 6-State Internally Balanced PMA 5 X-axis Response

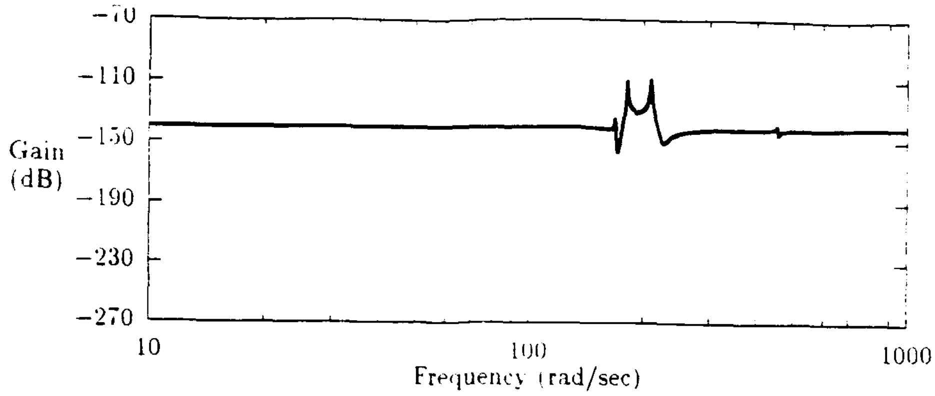

Figure D.52. 14-State Internally Balanced PMA 6 X-axis Response

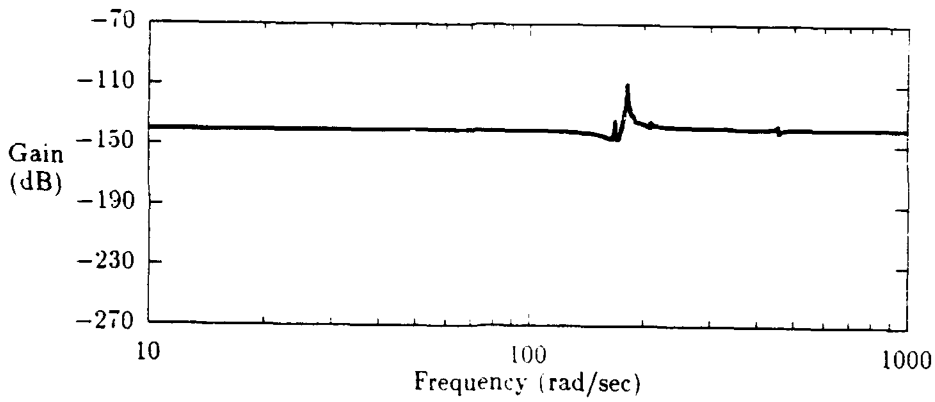

Figure D.53. 12-State Internally Balanced PMA 6 X-axis Response

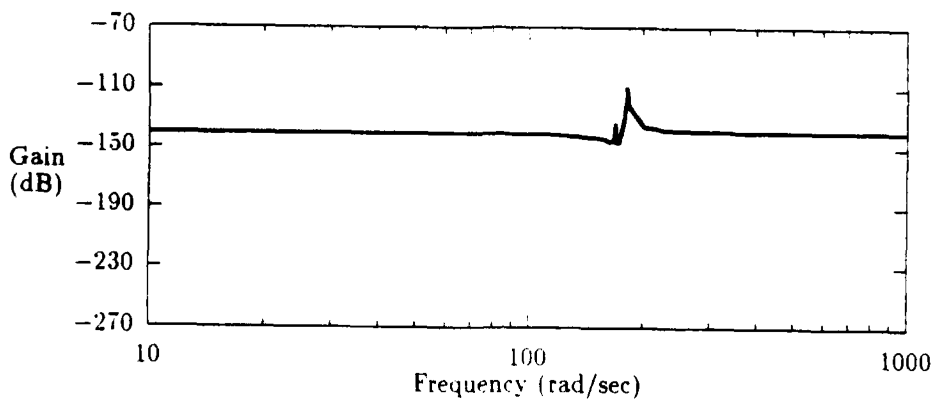

Figure D.54. 6-State Internally Balanced PMA 6 X-axis Response

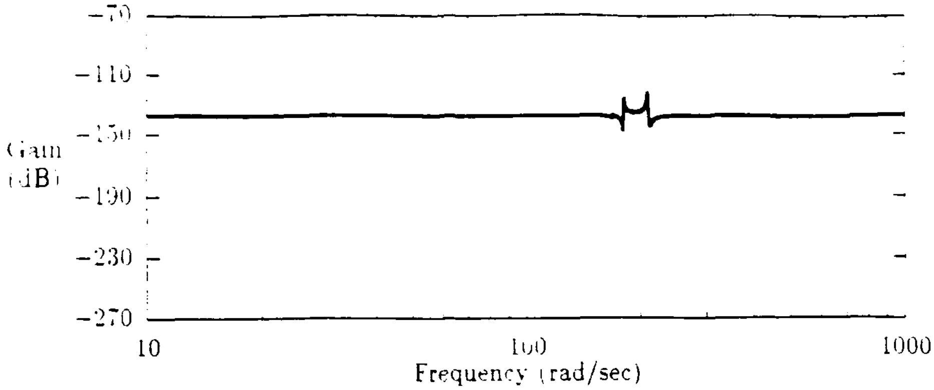

Figure D.55. 14-State Internally Balanced PMA 7 X-axis Response

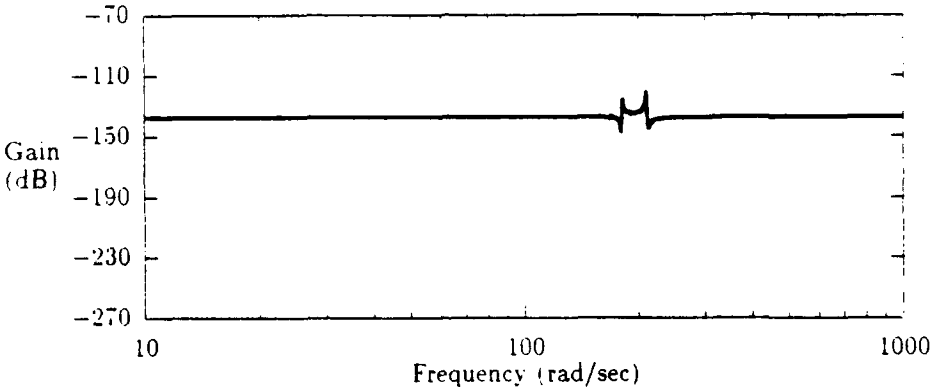

Figure D.56. 12-State Internally Balanced PMA 7 X-axis Response

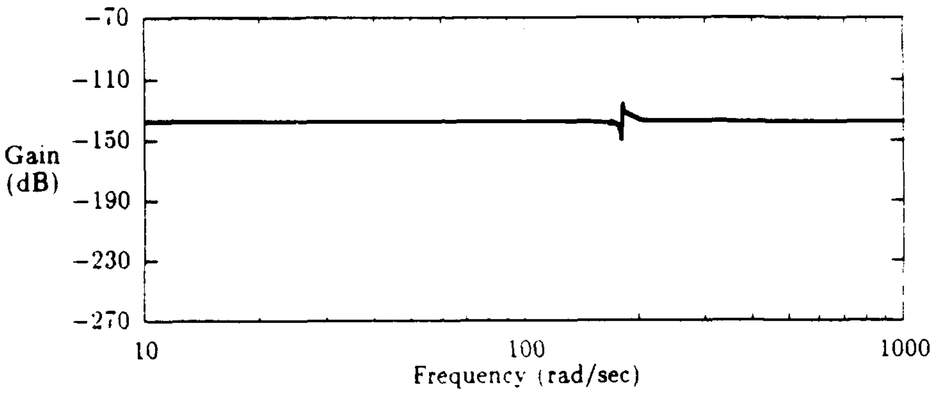

Figure D.57. 6-State Internally Balanced PMA 7 X-axis Response

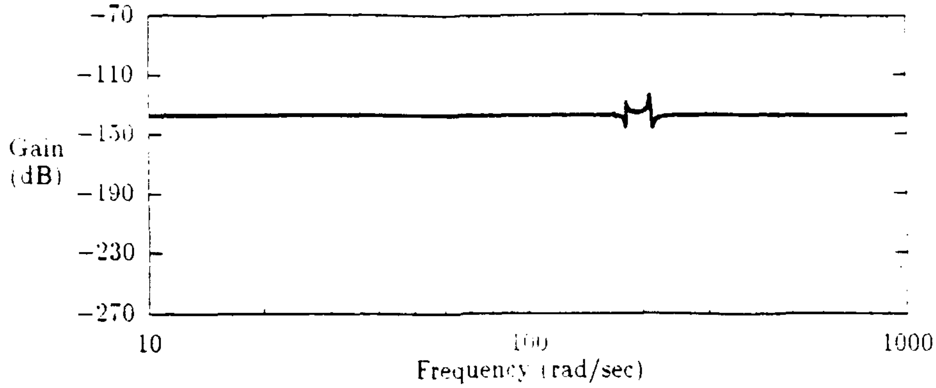

Figure D.58. 14-State Internally Balanced PMA 8 X-axis Response

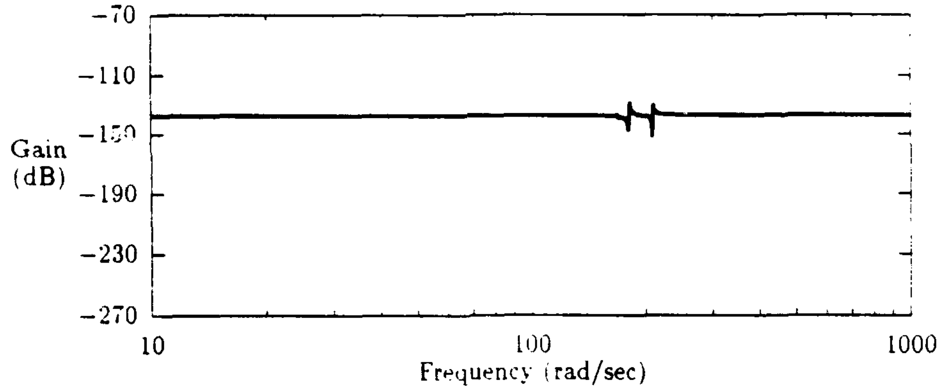

Figure D.59. 12-State Internally Balanced PMA 8 X-axis Response

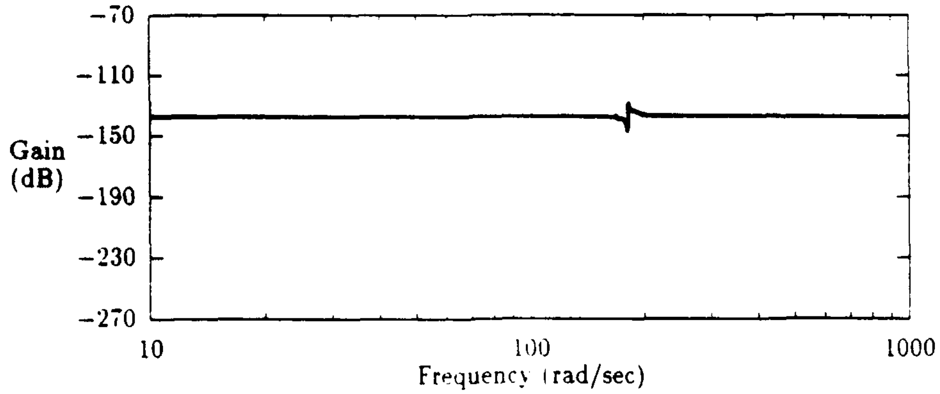

Figure D.60. 6-State Internally Balanced PMA 8 X-axis Response

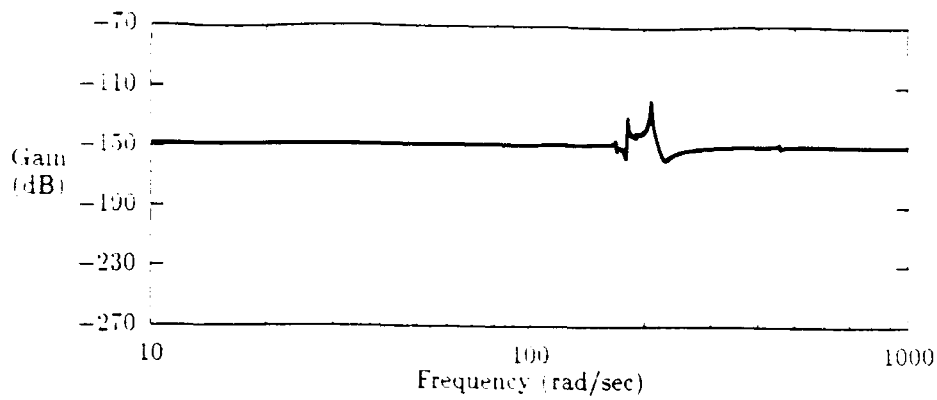

Figure D.61. 14-State Internally Balanced PMA 9 X-axis Response

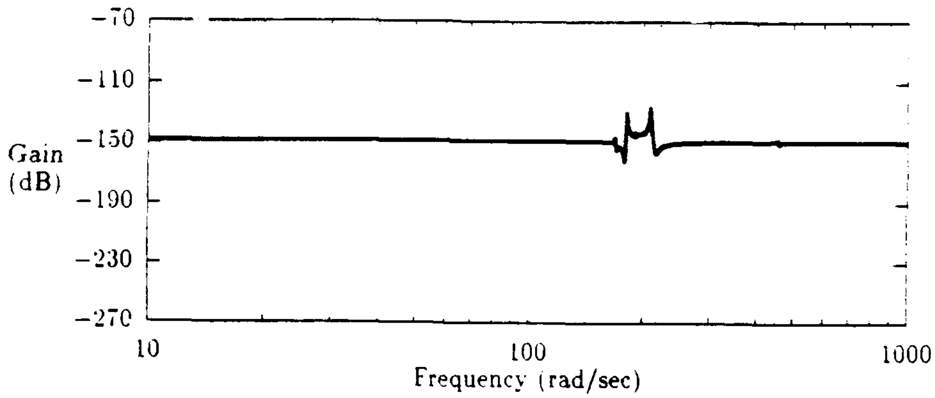

Figure D.62. 12-State Internally Balanced PMA 9 X-axis Response

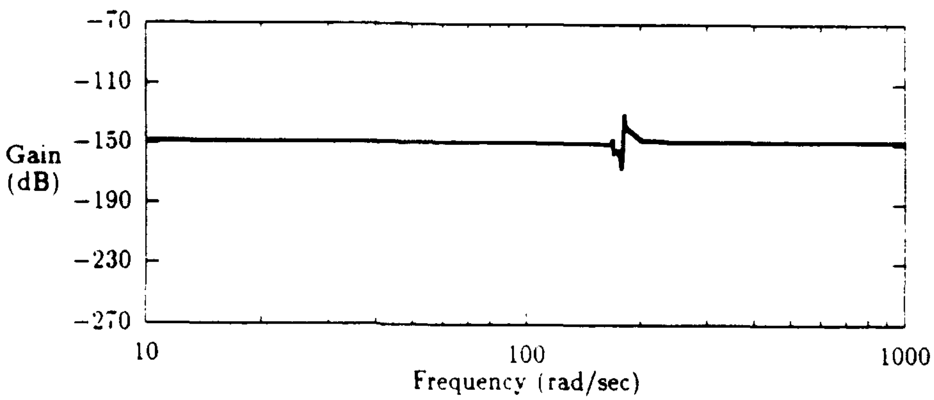

Figure D.63. 6-State Internally Balanced PMA 9 X-axis Response

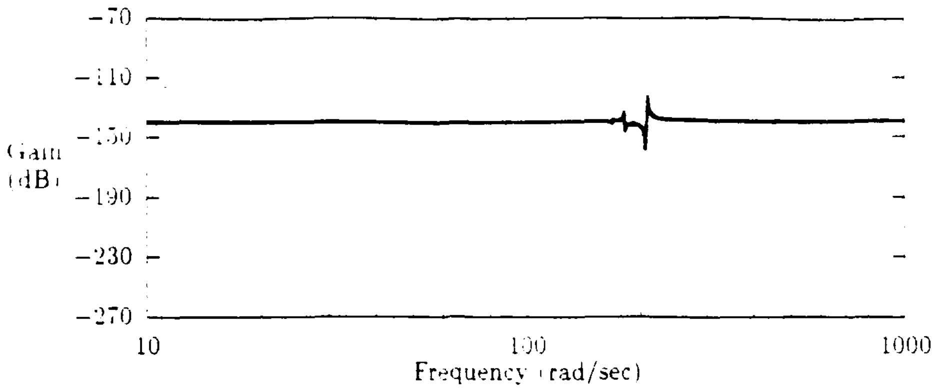

Figure D.64. 14-State Internally Balanced PMA 10 X-axis Response

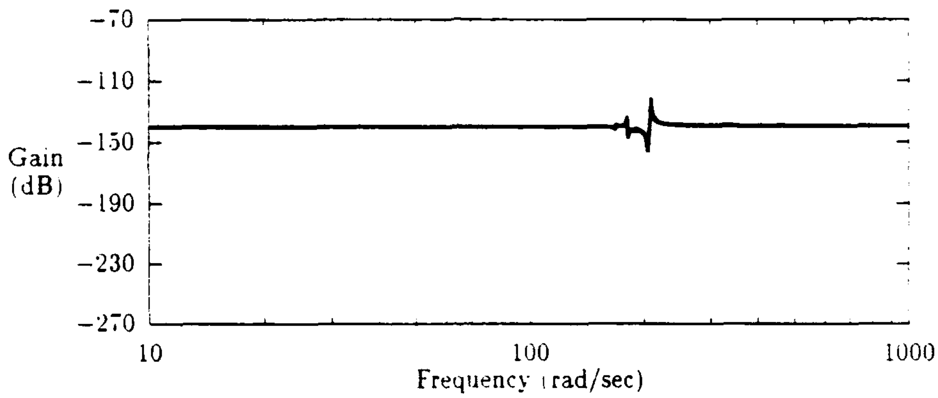

Figure D.65. 12-State Internally Balanced PMA 10 X-axis Response

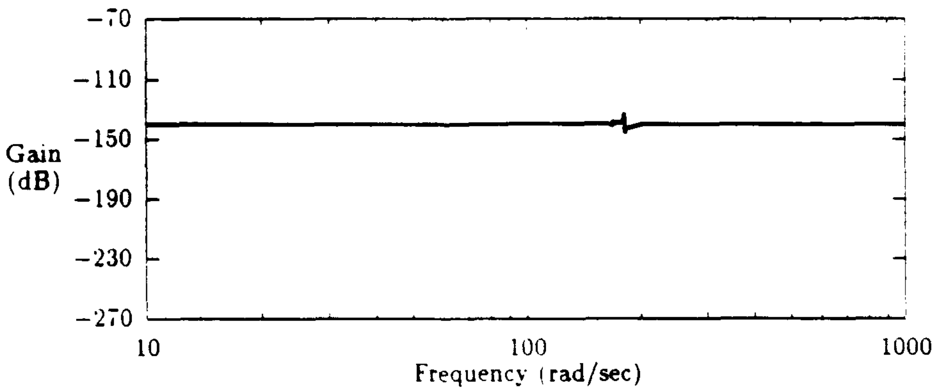

Figure D.66. 6-State Internally Balanced PMA 10 X-axis Response

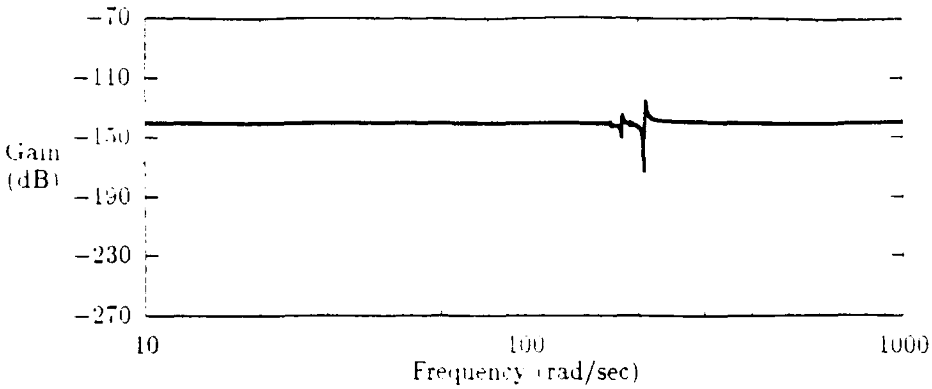

Figure D.67. 14-State Internally Balanced PMA 11 X-axis Response

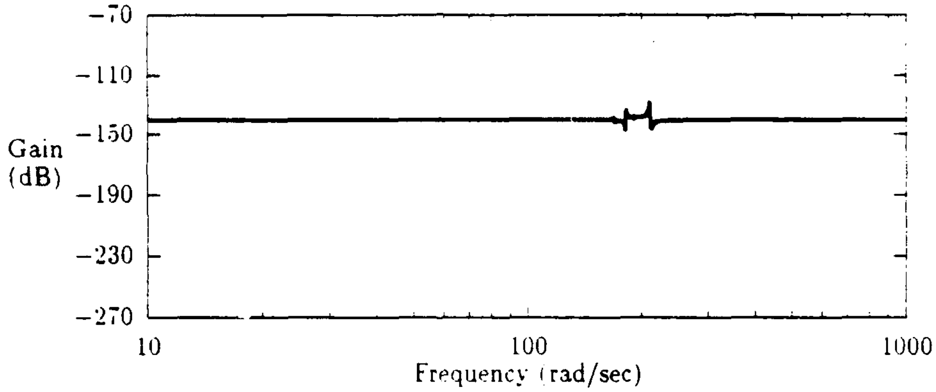

Figure D.68. 12-State Internally Balanced PMA 11 X-axis Response

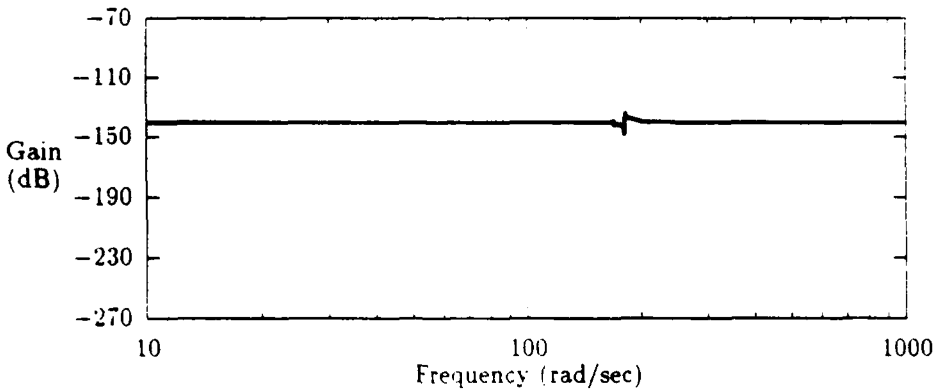

Figure D.69. 6-State Internally Balanced PMA 11 X-axis Response

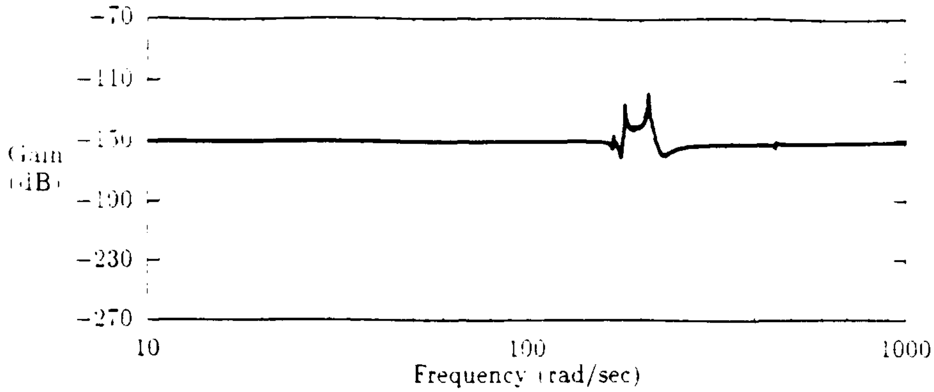

Figure D.70. 14-State Internally Balanced PMA 12 X-axis Response

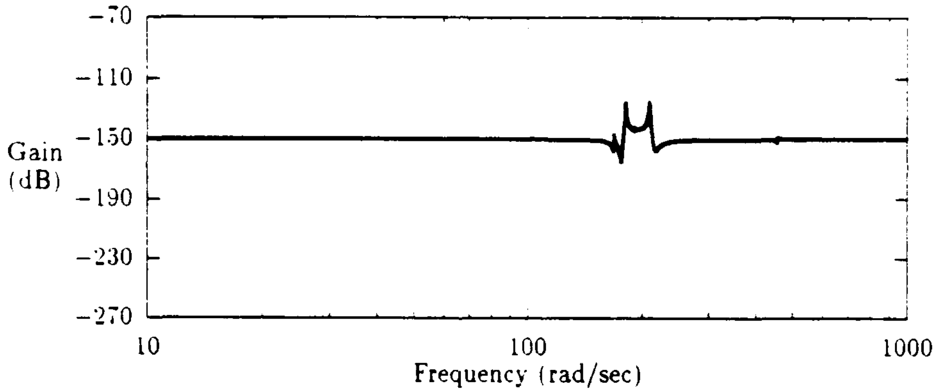

Figure D.71. 12-State Internally Balanced PMA 12 X-axis Response

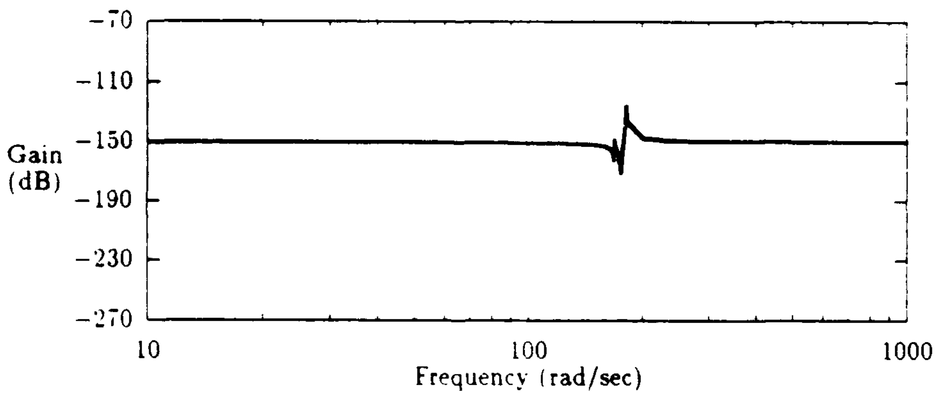

Figure D.72. 6-State Internally Balanced PMA 12 X-axis Response

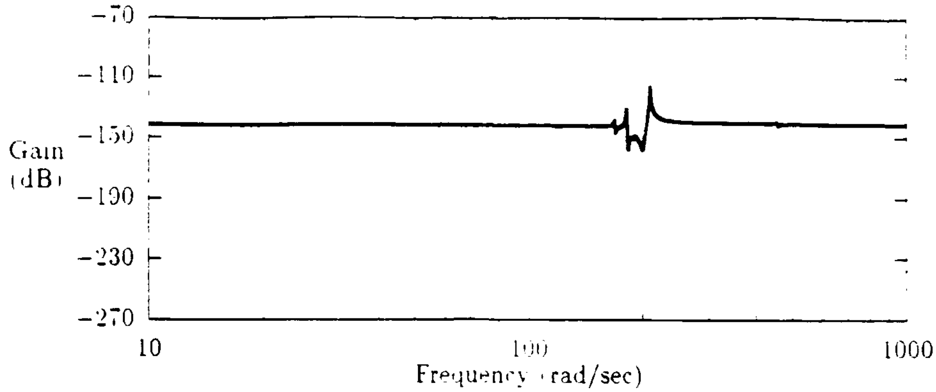

Figure D.73. 14-State Internally Balanced PMA 13 X-axis Response

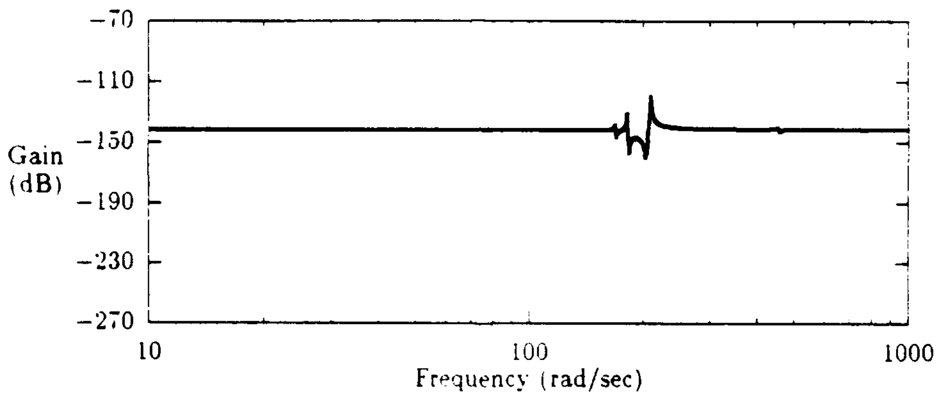

Figure D.74. 12-State Internally Balanced PMA 13 X-axis Response

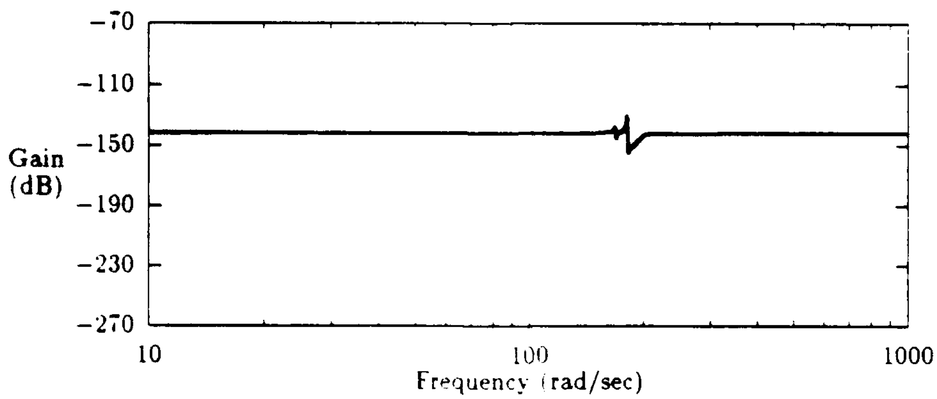

Figure D.75. 6-State Internally Balanced PMA 13 X-axis Response

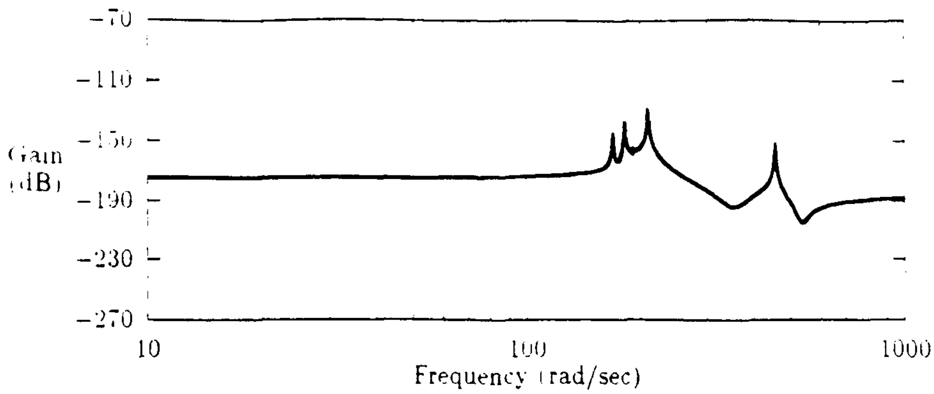

Figure D.76. 14-State Internally Balanced PMA 14 X-axis Response

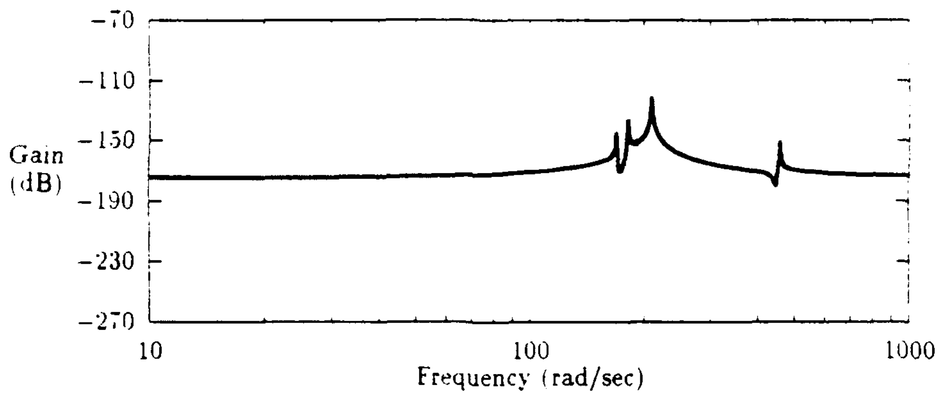

Figure D.77. 12-State Internally Balanced PMA 14 X-axis Response

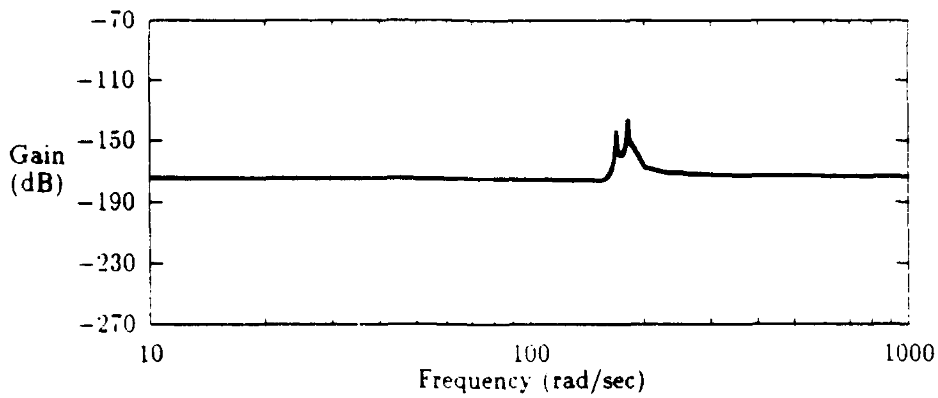

Figure D.78. 6-State Internally Balanced PMA 14 X-axis Response

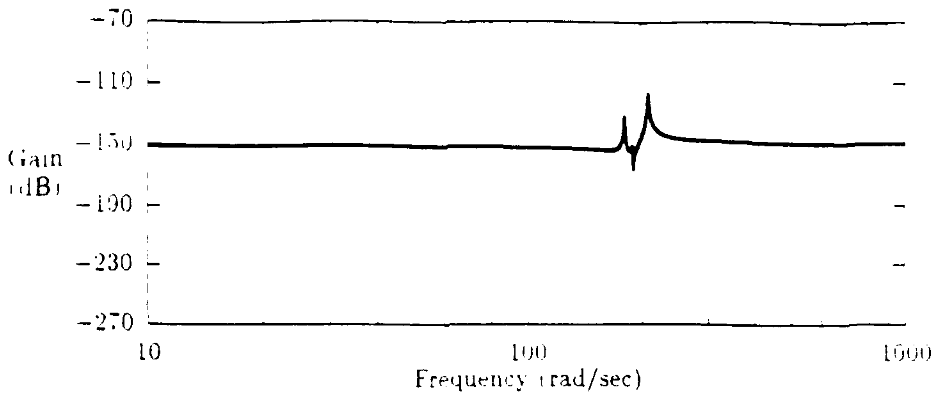

Figure D.79. 14-State Internally Balanced PMA 15 X-axis Response

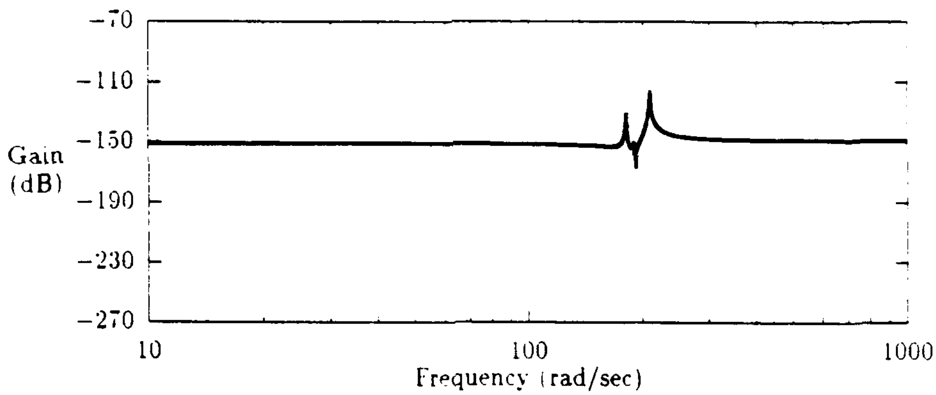

Figure D.80. 12-State Internally Balanced PMA 15 X-axis Response

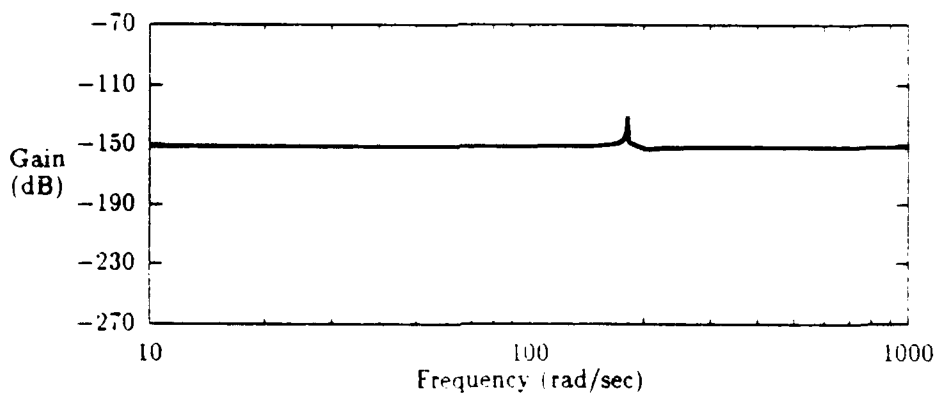

Figure D.81. 6-State Internally Balanced PMA 15 X-axis Response

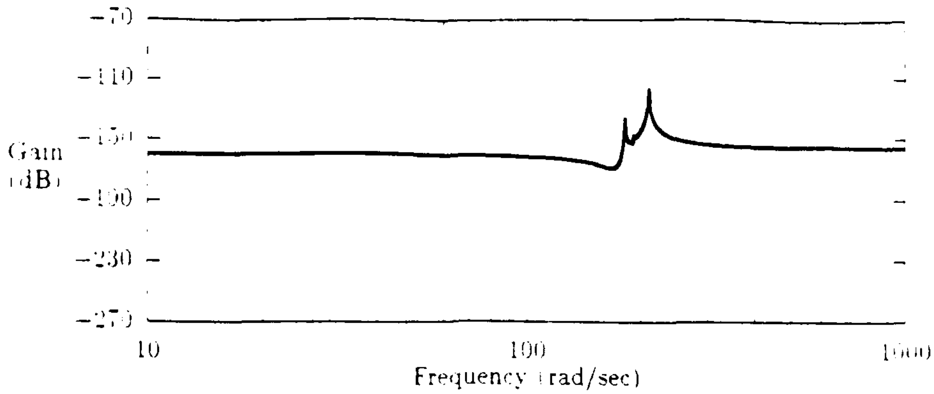

Figure D.82. 14-State Internally Balanced PMA 16 X-axis Response

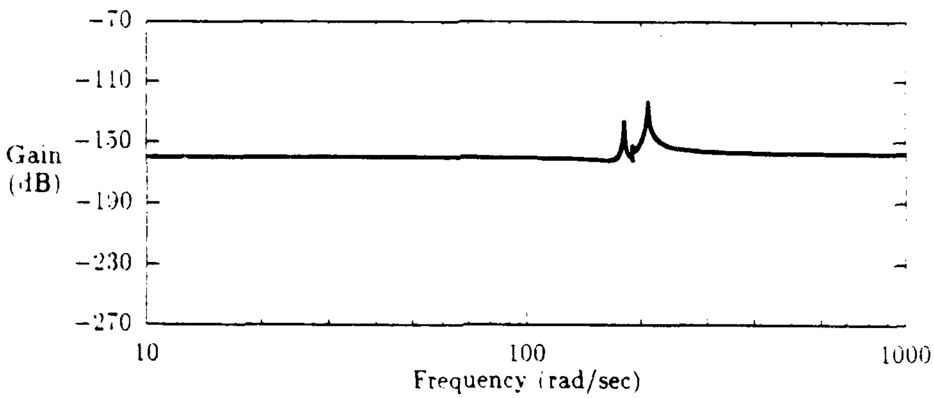

Figure D.83. 12-State Internally Balanced PMA 16 X-axis Response

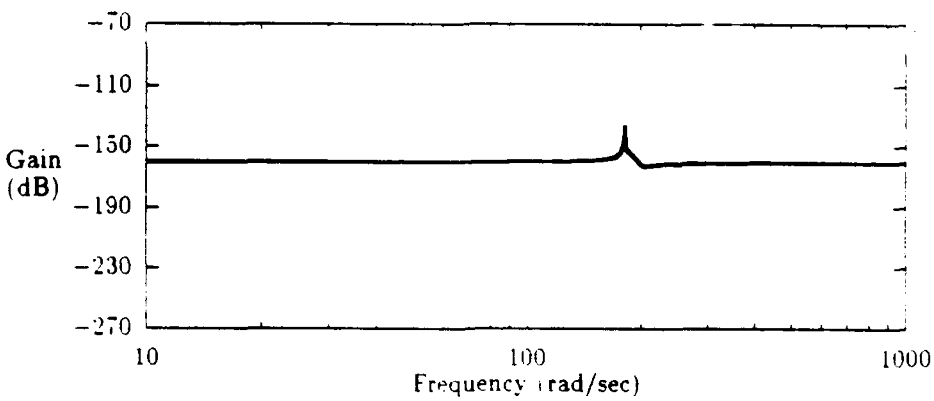

Figure D.84. 6-State Internally Balanced PMA 16 X-axis Response

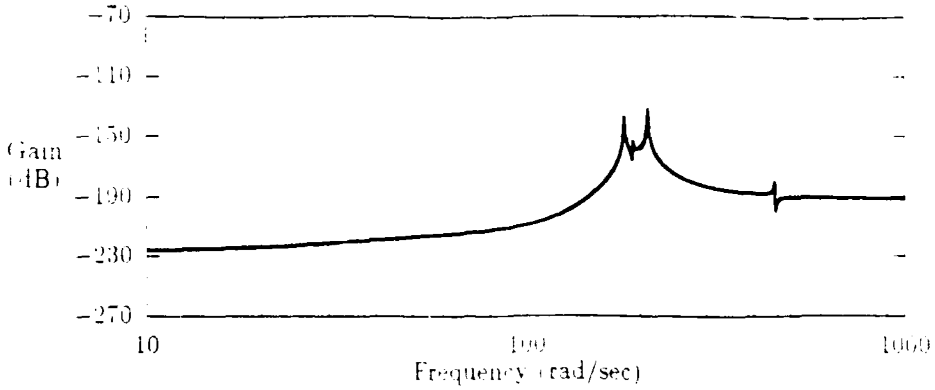

Figure D.85. 14-State Internally Balanced PMA 17 X-axis Response

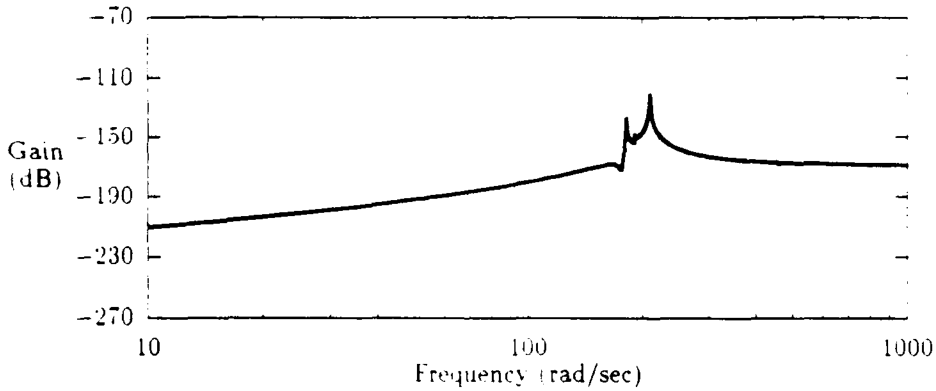

Figure D.86. 12-State Internally Balanced PMA 17 X-axis Response

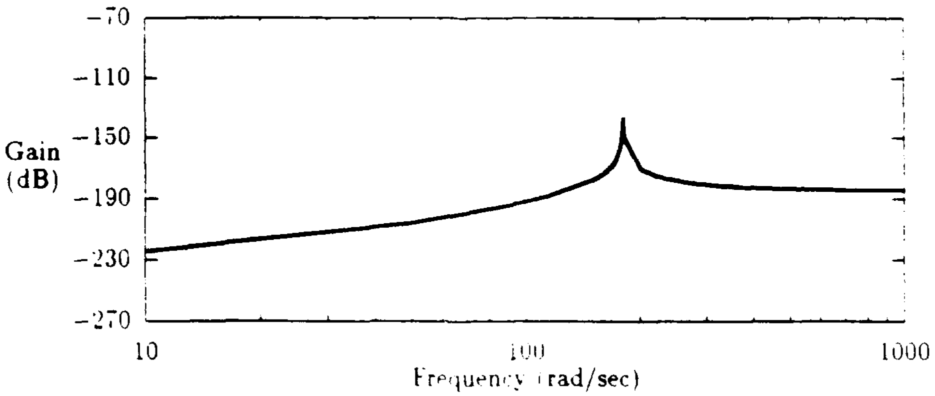

Figure D.87. 6-State Internally Balanced PMA 17 X-axis Response

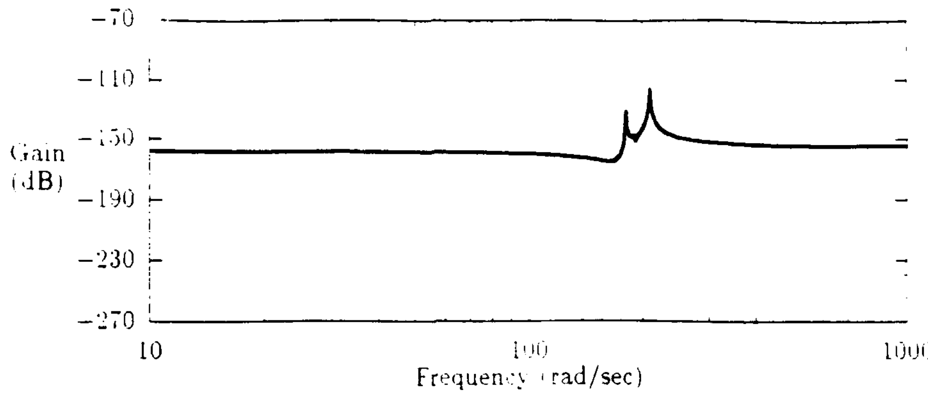

Figure D.88. 14-State Internally Balanced PMA 18 X-axis Response

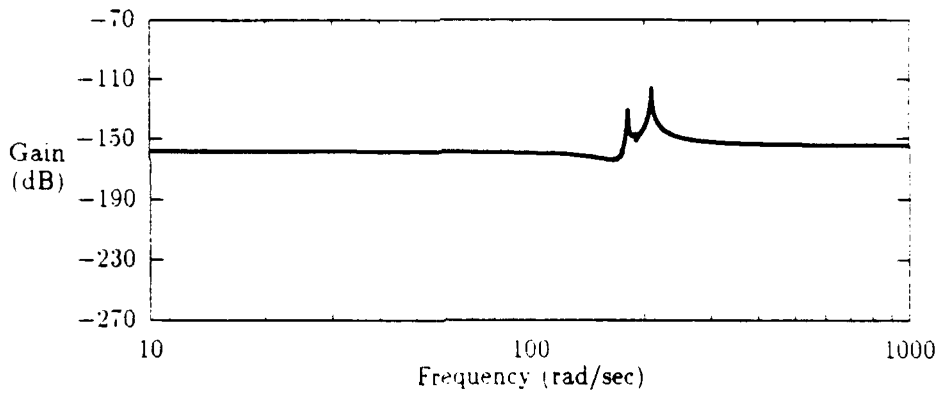

Figure D.89. 12-State Internally Balanced PMA 18 X-axis Response

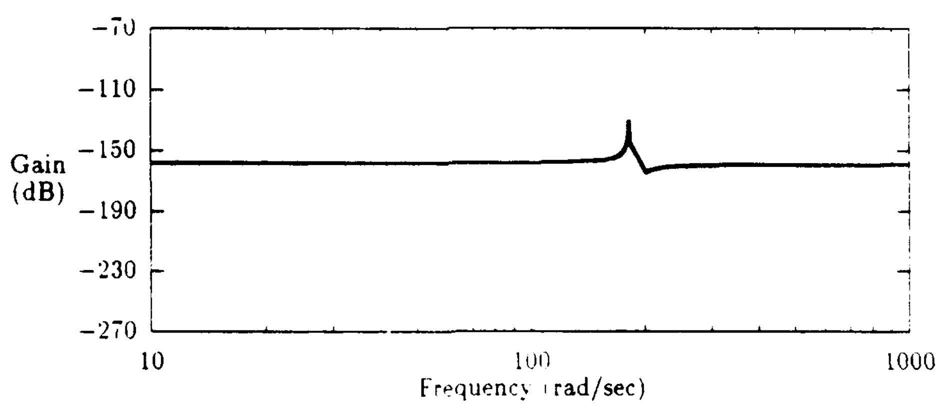

Figure D.90. 6-State Internally Balanced PMA 18 X-axis Response

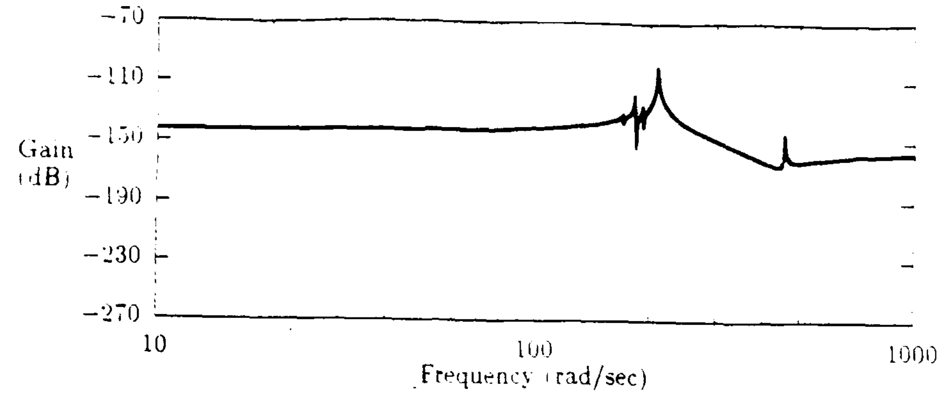

Figure D.91. 14-State Internally Balanced PMA 1 Y-axis Response

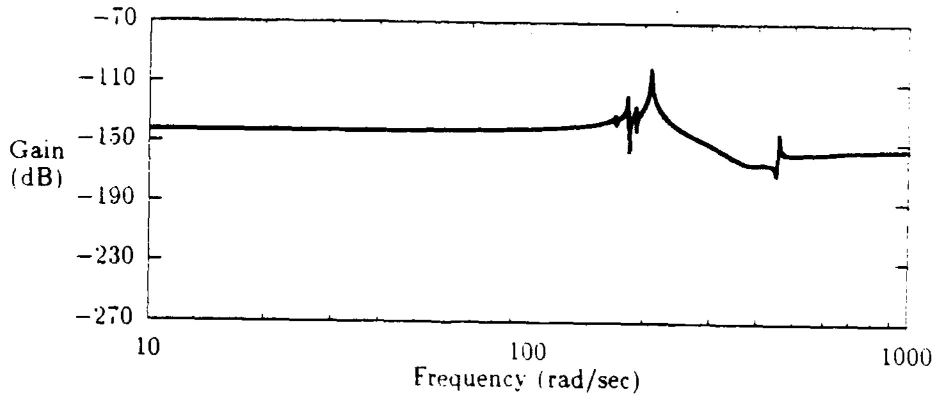

Figure D.92. 12-State Internally Balanced PMA 1 Y-axis Response

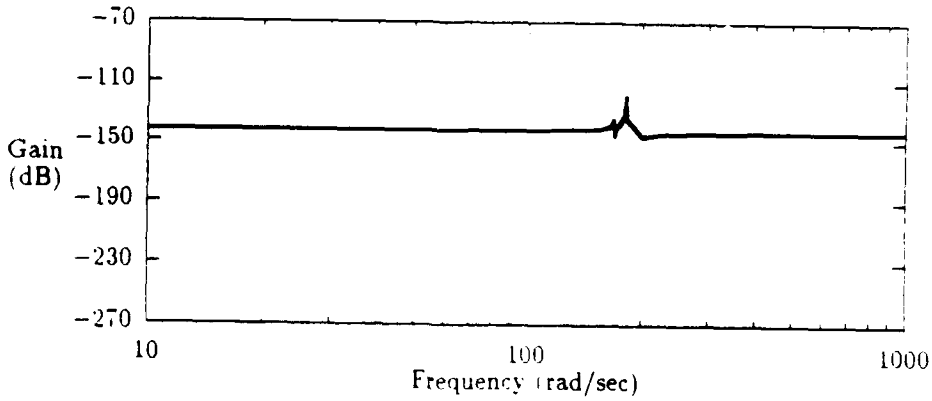

Figure D.93. 6-State Internally Balanced PMA 1 Y-axis Response

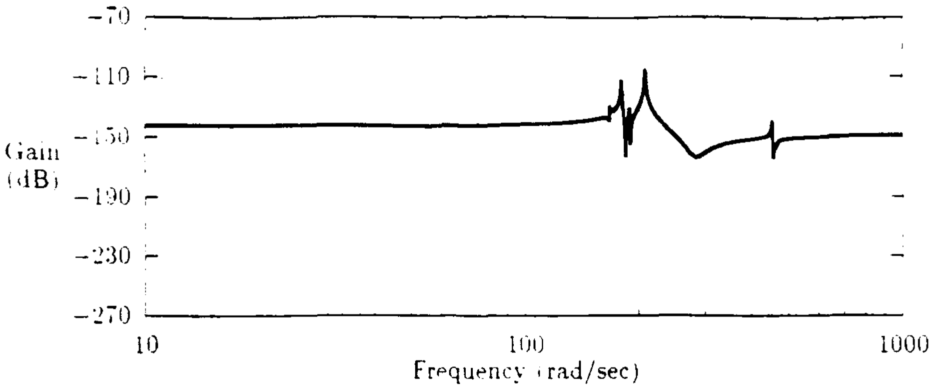

Figure D.94. 14-State Internally Balanced PMA 2 Y-axis Response

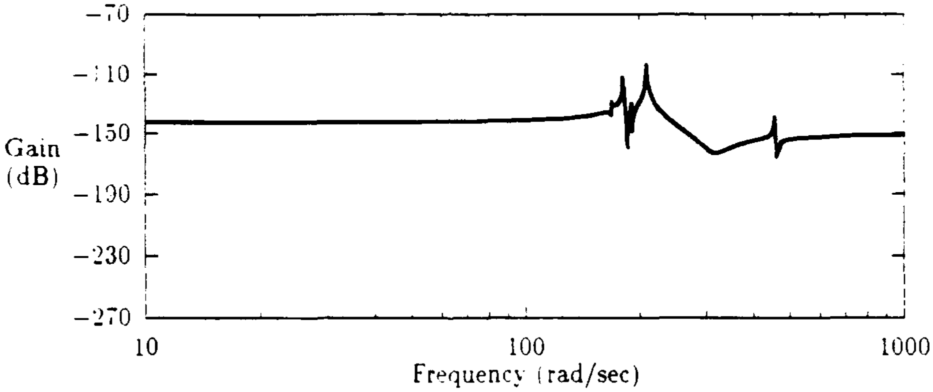

Figure D.95. 12-State Internally Balanced PMA 2 Y-axis Response

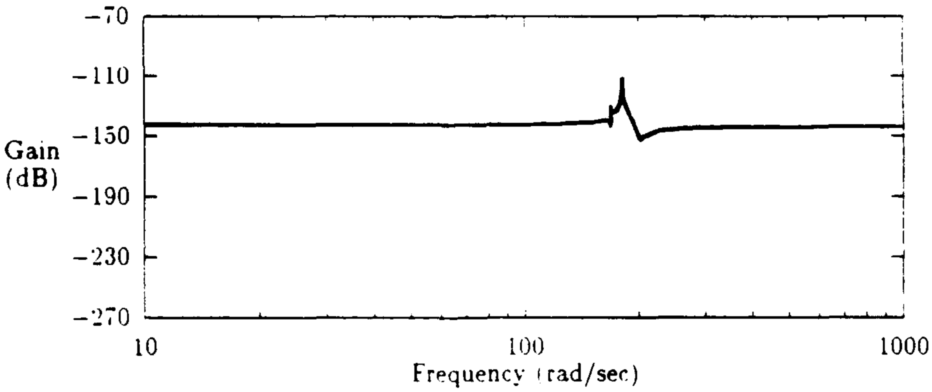

Figure D.96. 6-State Internally Balanced PMA 2 Y-axis Response

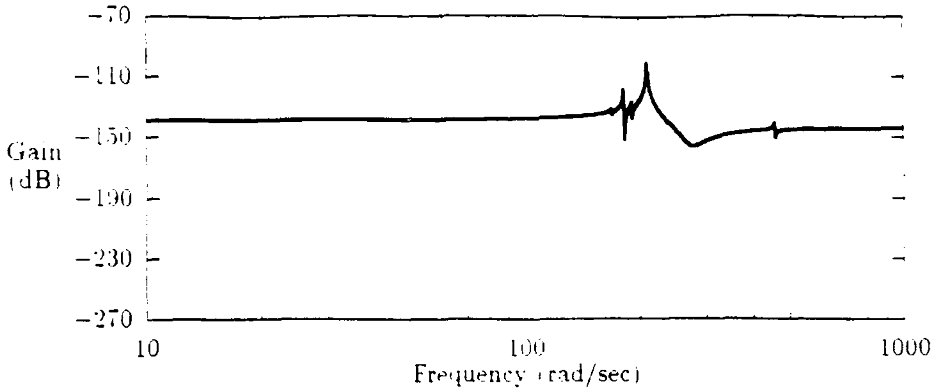

Figure D.97. 14-State Internally Balanced PMA 3 Y-axis Response

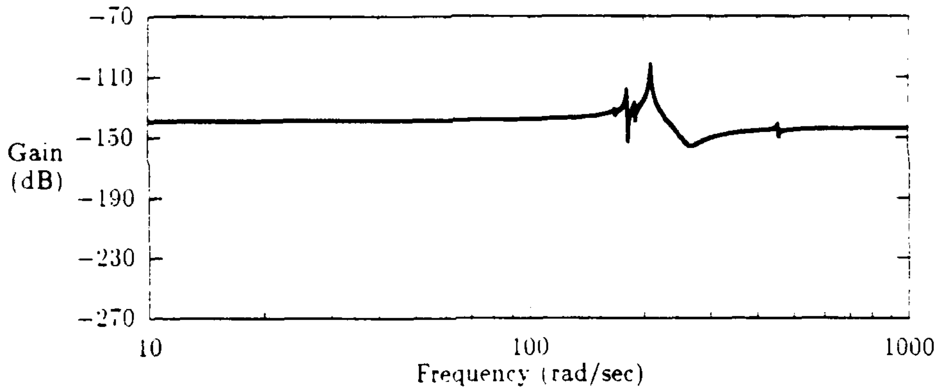

Figure D.98. 12-State Internally Balanced PMA 3 Y-axis Response

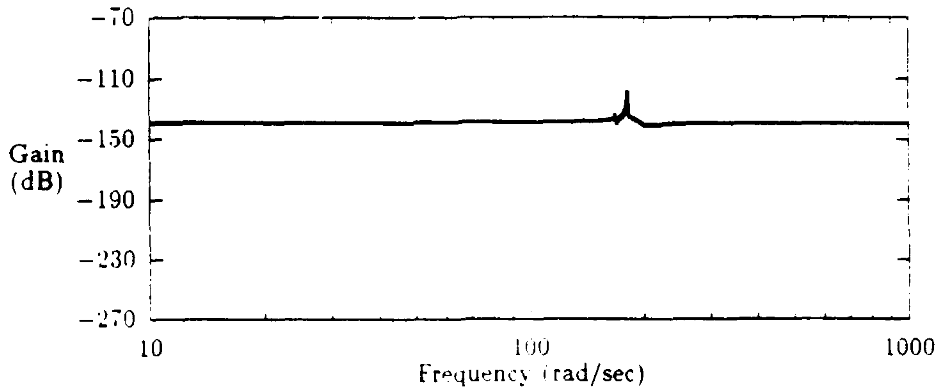

Figure D.99. 6-State Internally Balanced PMA 3 Y-axis Response

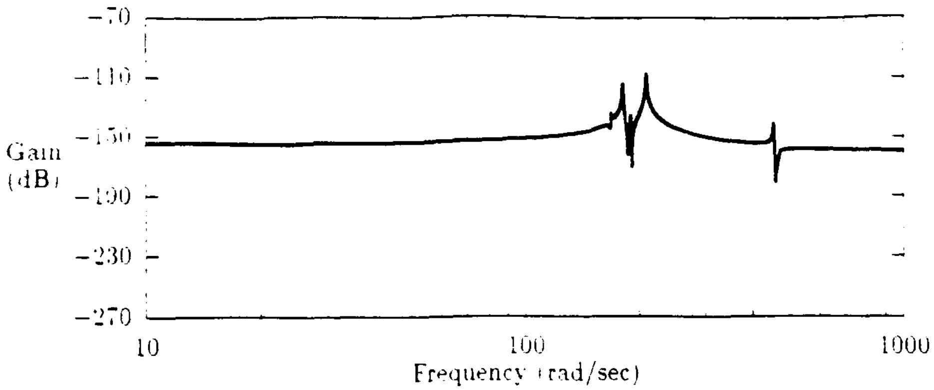

Figure D.100. 14-State Internally Balanced PMA 4 Y-axis Response

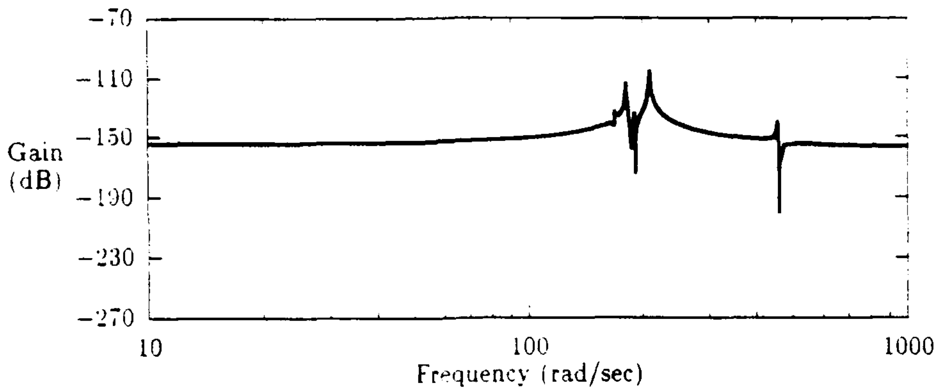

Figure D.101. 12-State Internally Balanced PMA 4 Y-axis Response

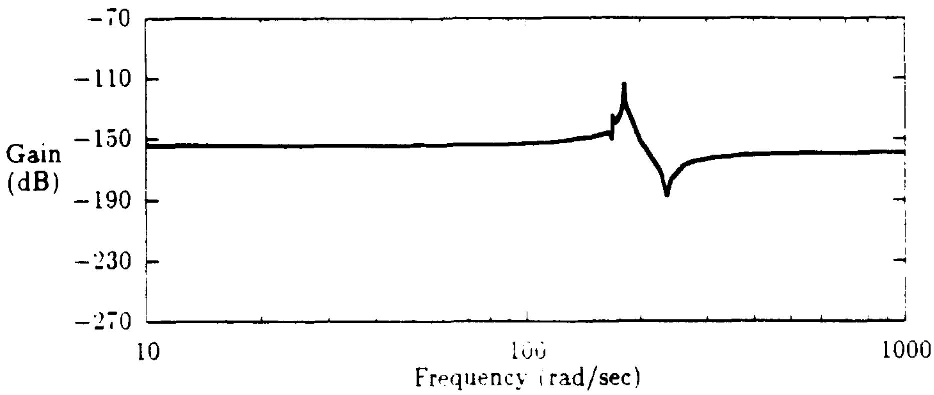

Figure D.102. 6-State Internally Balanced PMA 4 Y-axis Response

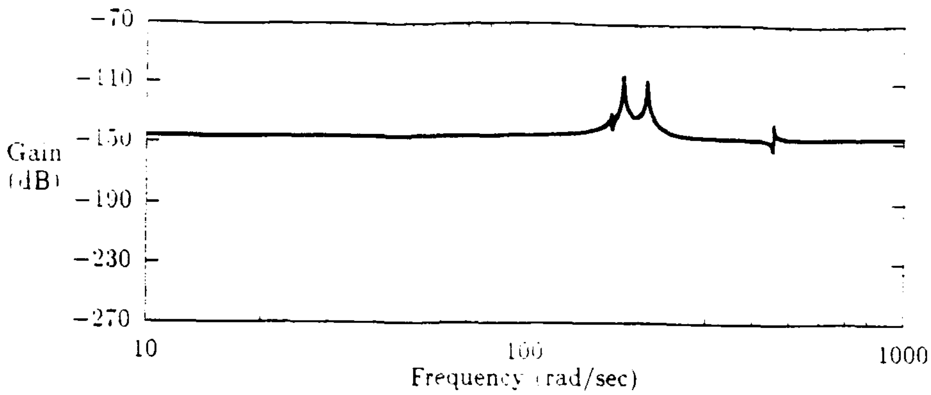

Figure D.103. 14-State Internally Balanced PMA 5 Y-axis Response

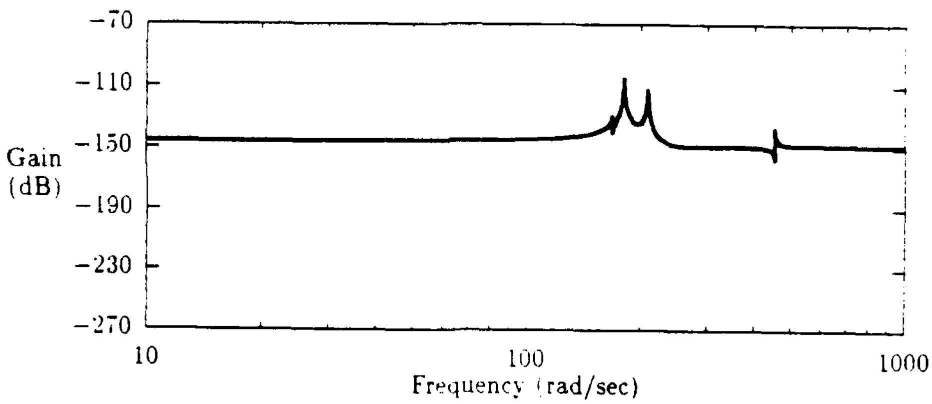

Figure D.104. 12-State Internally Balanced PMA 5 Y-axis Response

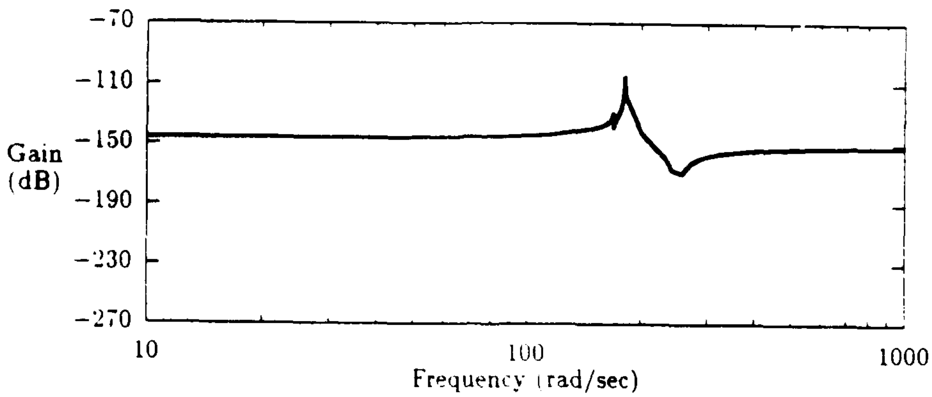

Figure D.105. 6-State Internally Balanced PMA 5 Y-axis Response

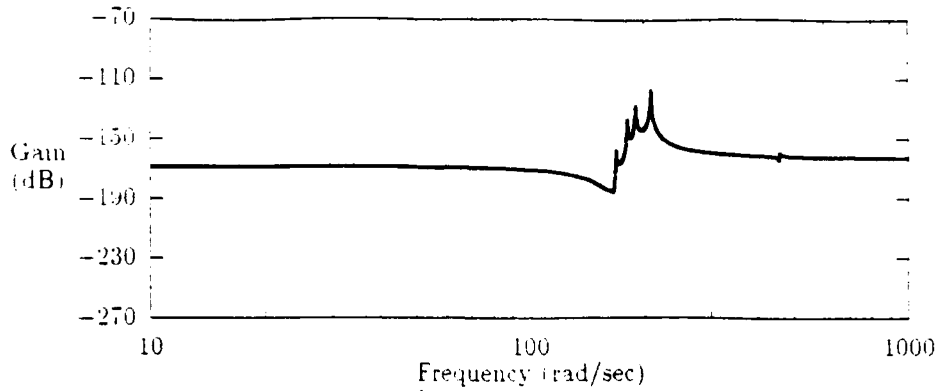

Figure D.106. 14-State Internally Balanced PMA 6 Y-axis Response

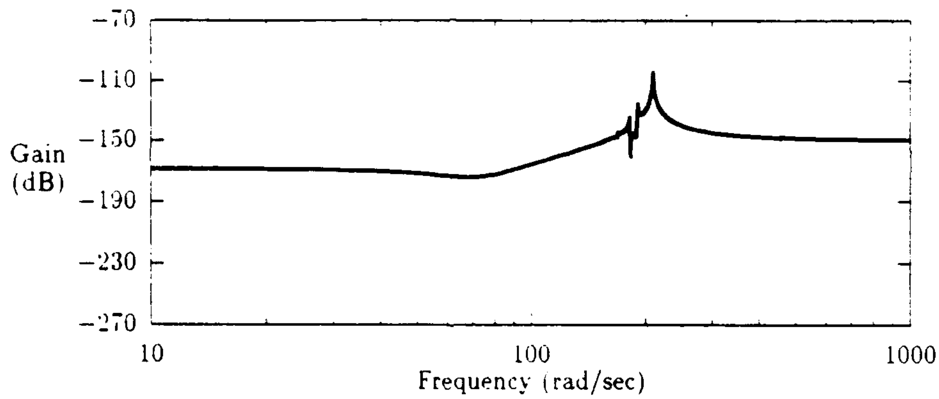

Figure D.107. 12-State Internally Balanced PMA 6 Y-axis Response

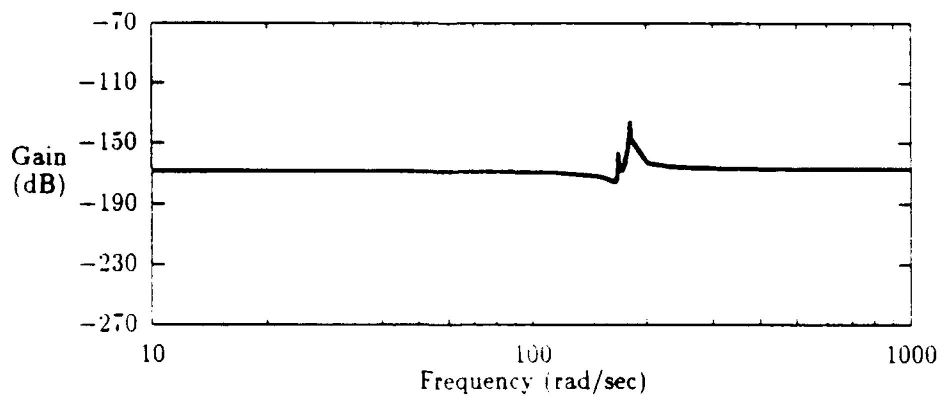

Figure D.108. 6-State Internally Balanced PMA 6 Y-axis Response

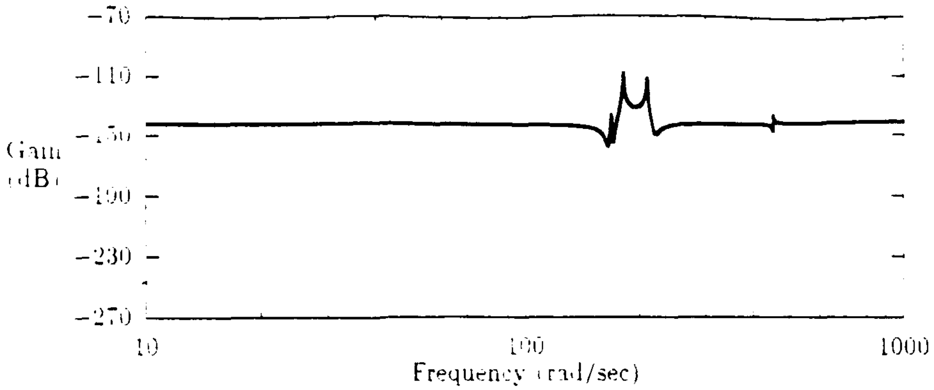

Figure D.109. 14-State Internally Balanced PMA 7 Y-axis Response

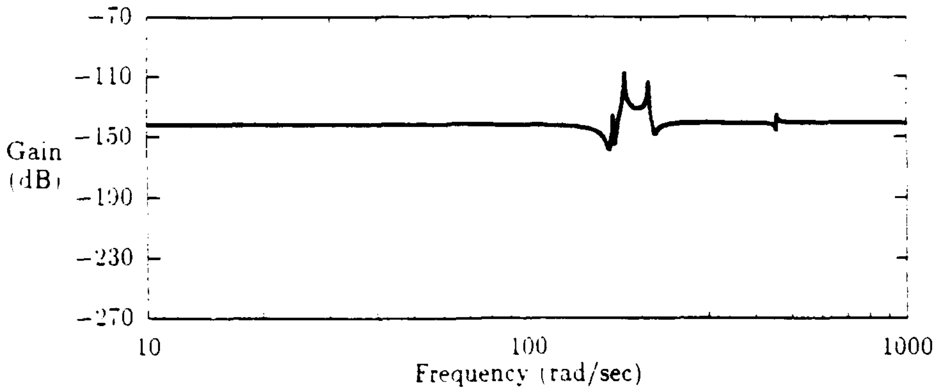

Figure D.110. 12-State Internally Balanced PMA 7 Y-axis Response

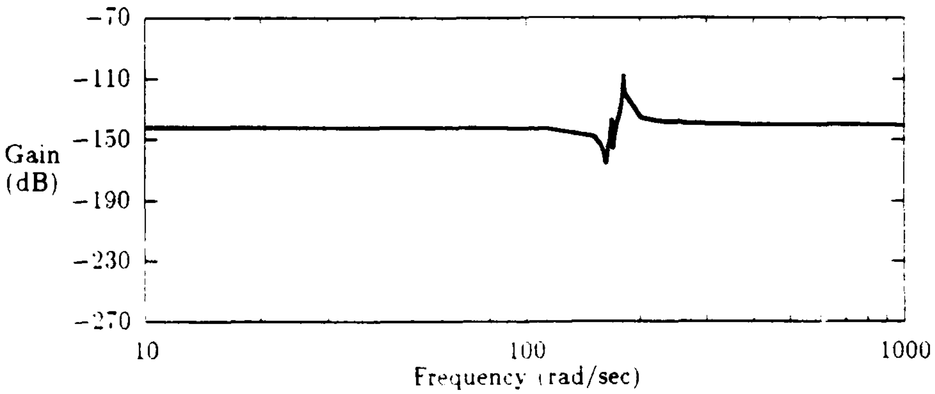

Figure D.111. 6-State Internally Balanced PMA 7 Y-axis Response

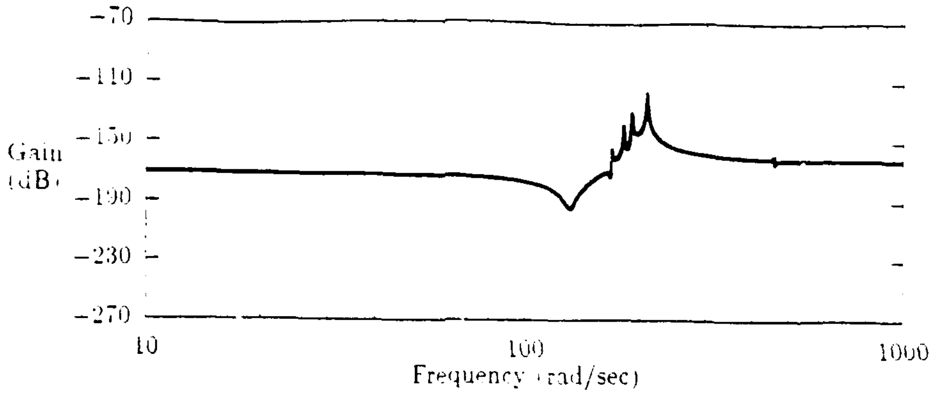

Figure D.112. 14-State Internally Balanced PMA 8 Y-axis Response

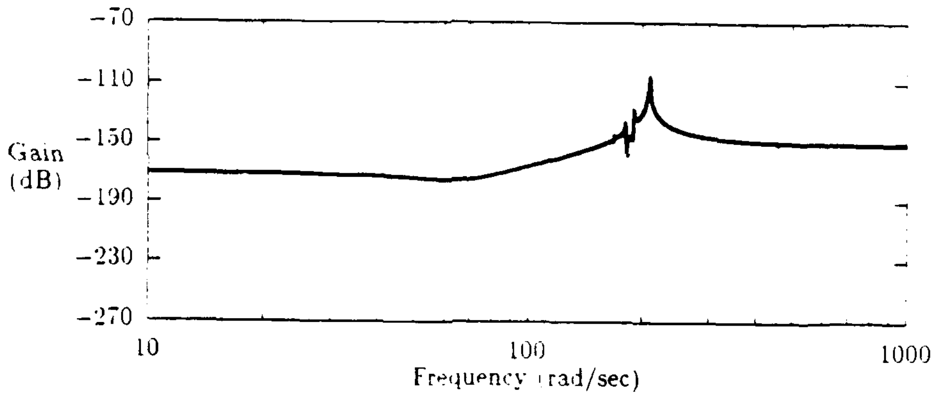

Figure D.113. 12-State Internally Balanced PMA 8 Y-axis Response

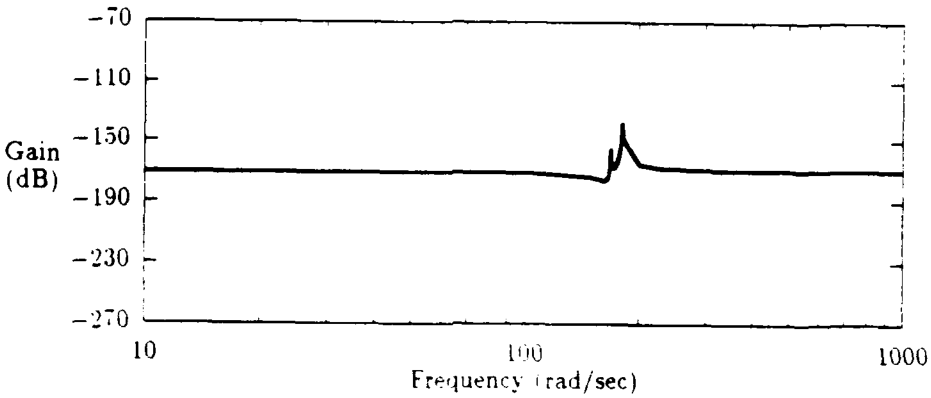

Figure D.114. 6-State Internally Balanced PMA 8 Y-axis Response

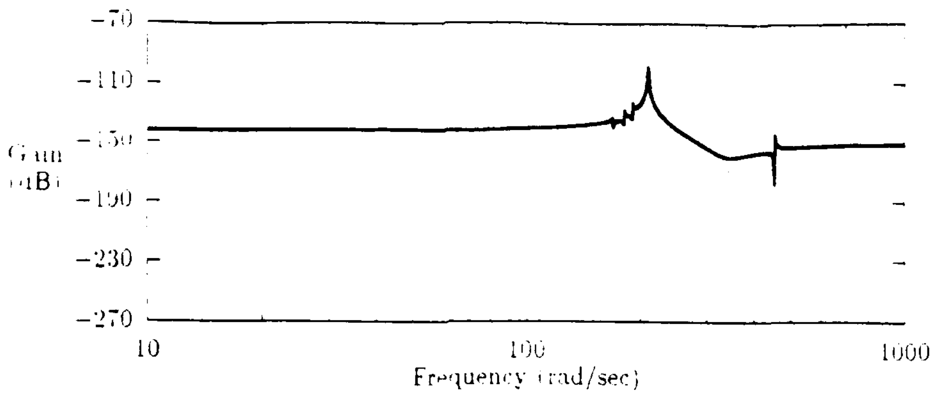

Figure D.115. 14-State Internally Balanced PMA 9 Y-axis Response

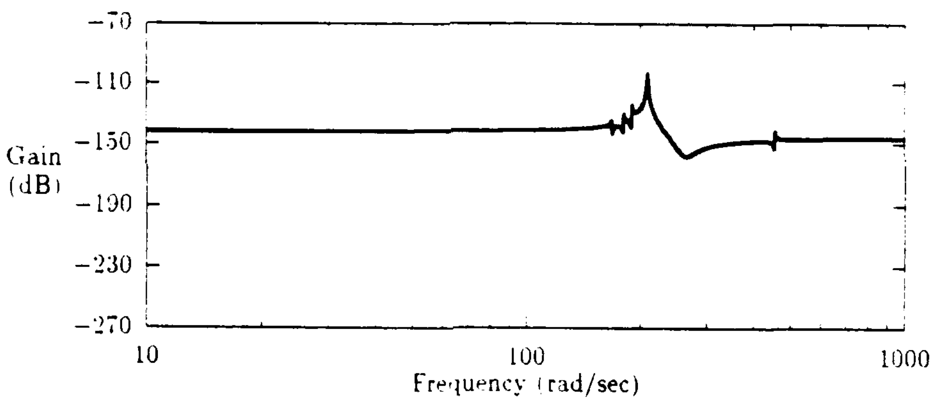

Figure D.116. 12-State Internally Balanced PMA 9 Y-axis Response

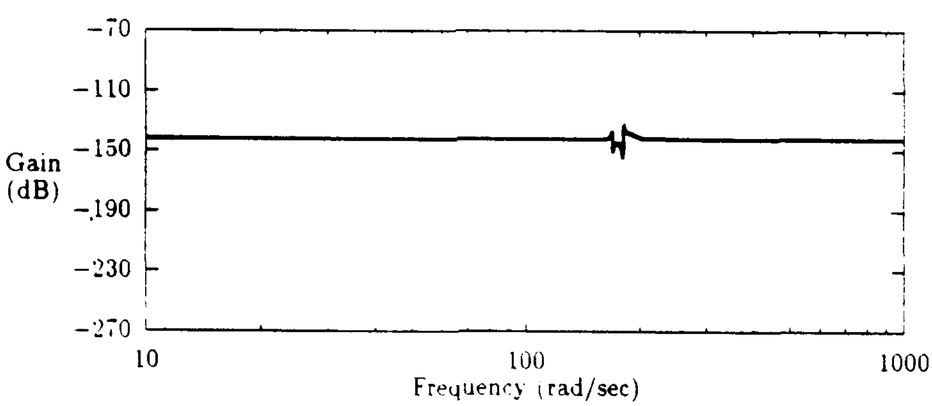

Figure D.117. 6-State Internally Balanced PMA 9 Y-axis Response

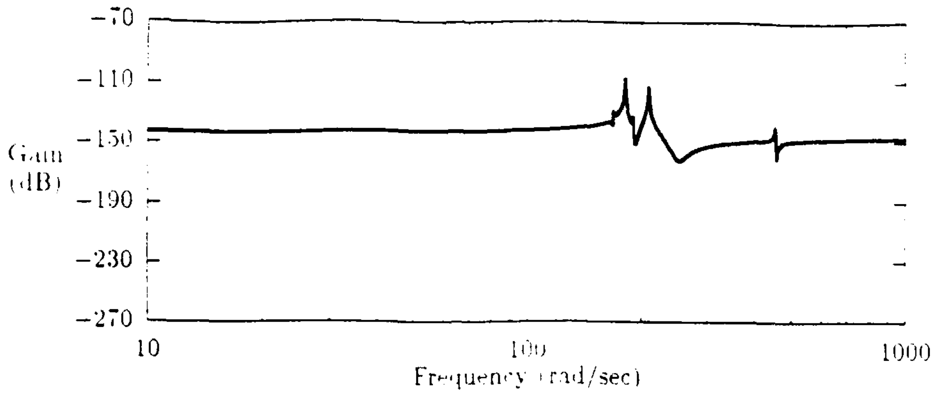

Figure D.118. 14-State Internally Balanced PMA 10 Y-axis Response

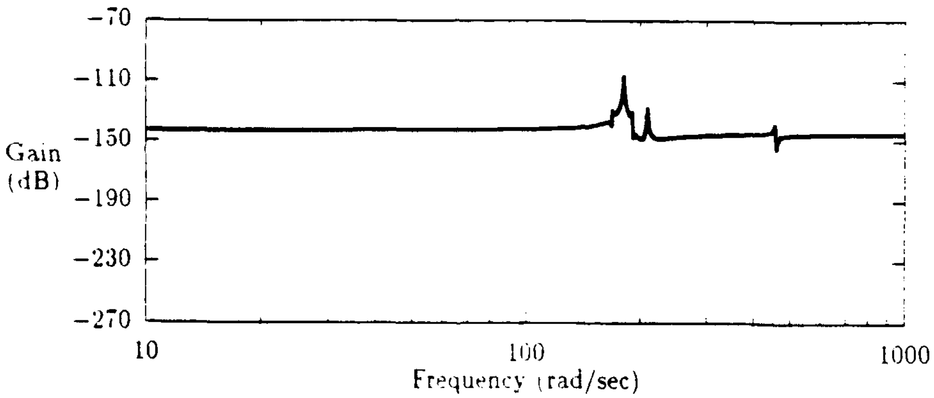

Figure D.119. 12-State Internally Balanced PMA 10 Y-axis Response

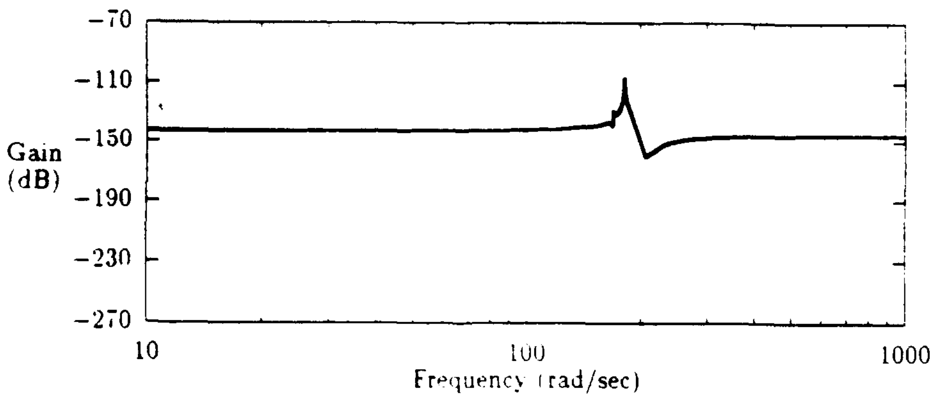

Figure D.120. 6-State Internally Balanced PMA 10 Y-axis Response

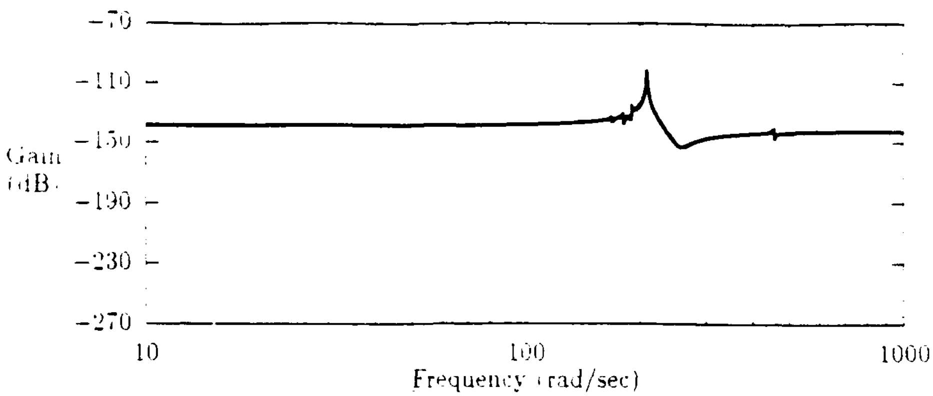

Figure D.121. 14-State Internally Balanced PMA 11 Y-axis Response

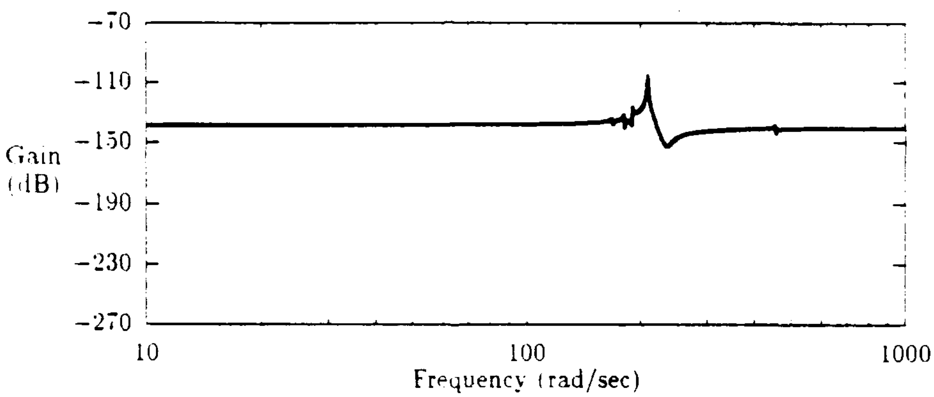

Figure D.122. 12-State Internally Balanced PMA 11 Y-axis Response

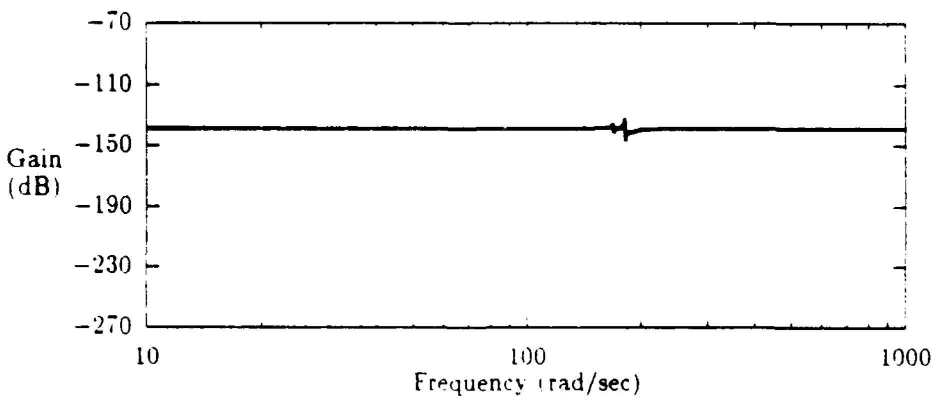

Figure D.123. 6-State Internally Balanced PMA 11 Y-axis Response

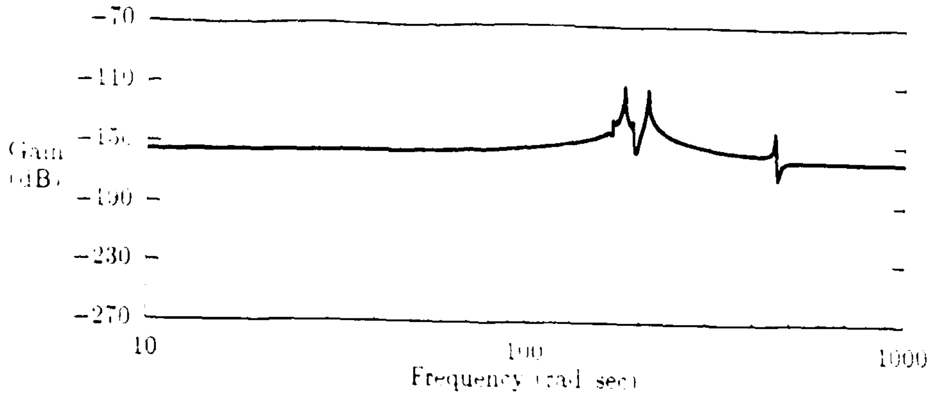

Figure D.124. 14-State Internally Balanced PMA 12 Y-axis Response

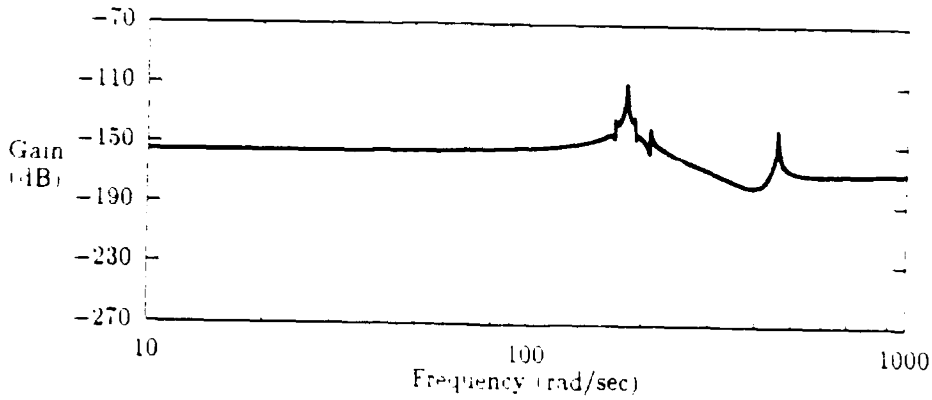

Figure D.125. 12-State Internally Balanced PMA 12 Y-axis Response

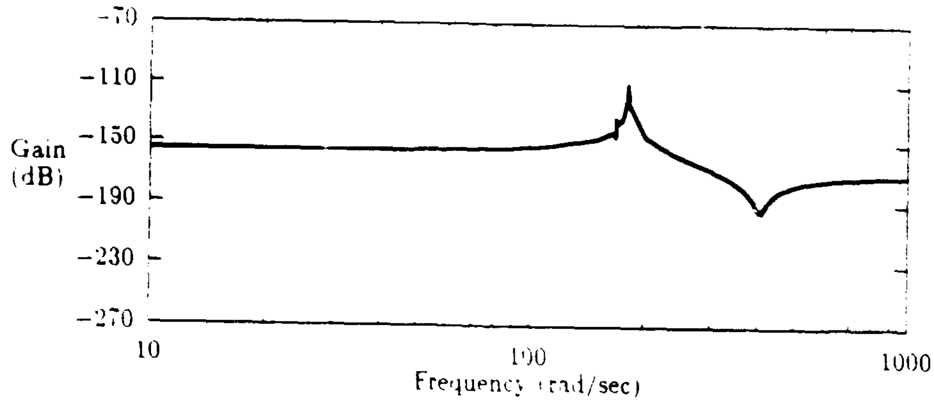

Figure D.126. 6-State Internally Balanced PMA 12 Y-axis Response

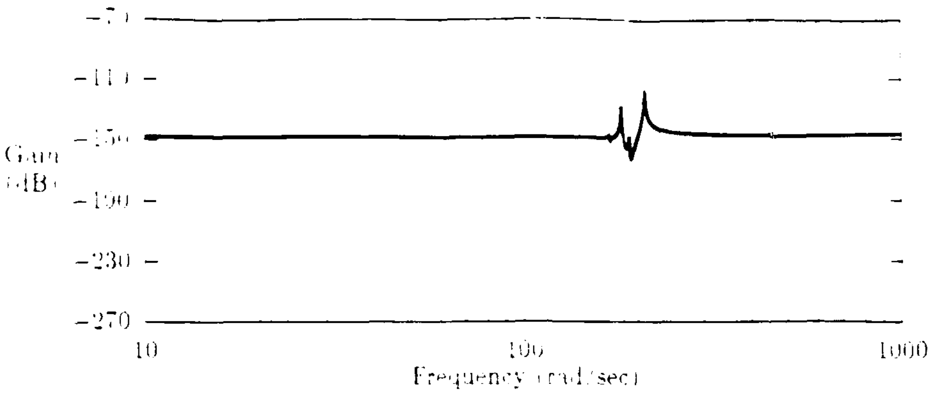

Figure D.127. 14-State Internally Balanced PMA 13 Y-axis Response

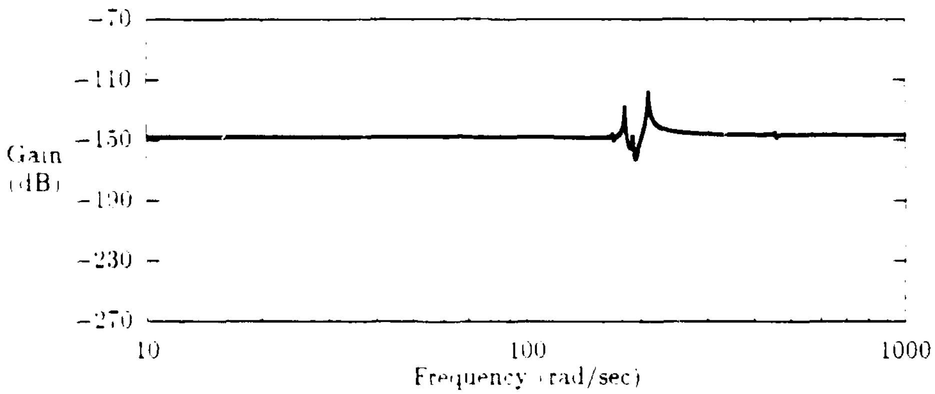

Figure D.128. 12-State Internally Balanced PMA 13 Y-axis Response

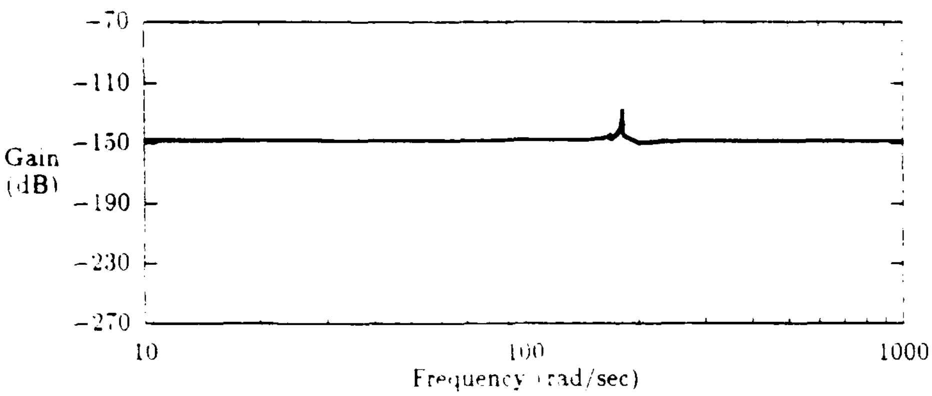

Figure D.129. 6-State Internally Balanced PMA 13 Y-axis Response

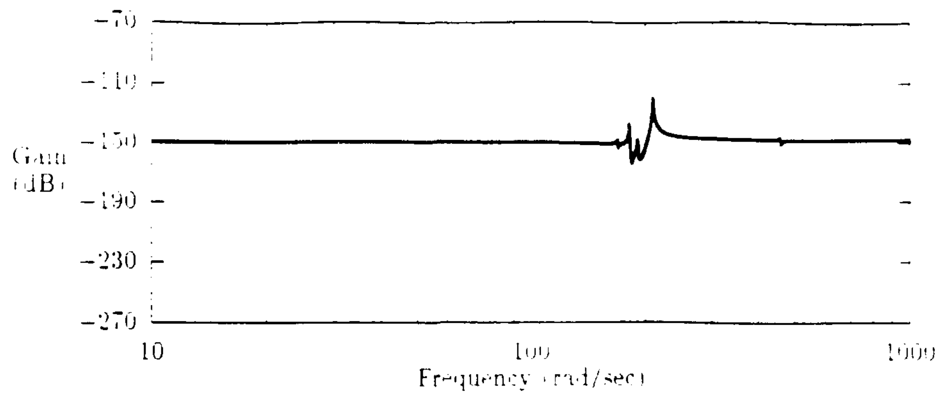

Figure D.130. 14-State Internally Balanced PMA 14 Y-axis Response

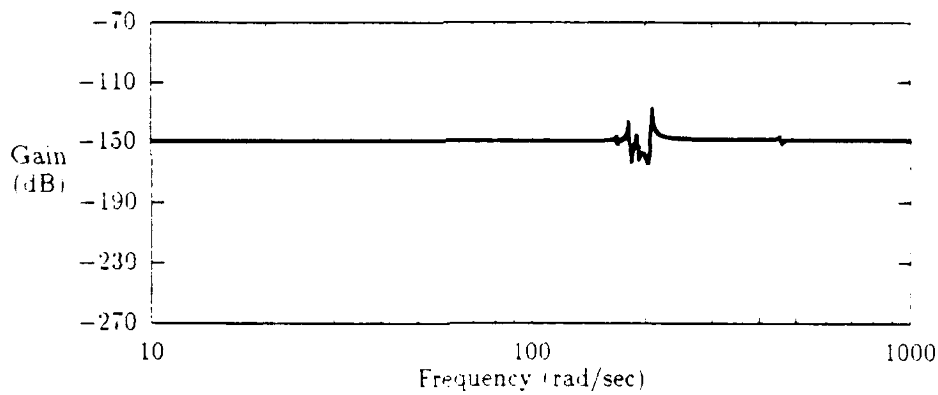

Figure D.131. 12-State Internally Balanced PMA 14 Y-axis Response

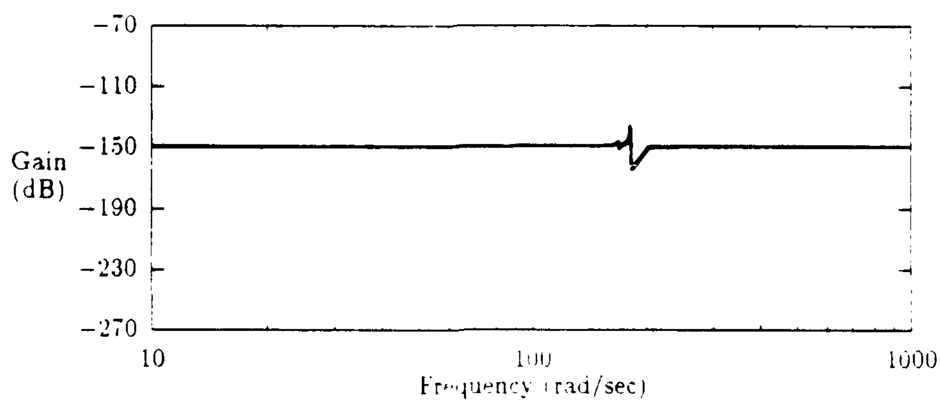

Figure D.132. 6-State Internally Balanced PMA 14 Y-axis Response

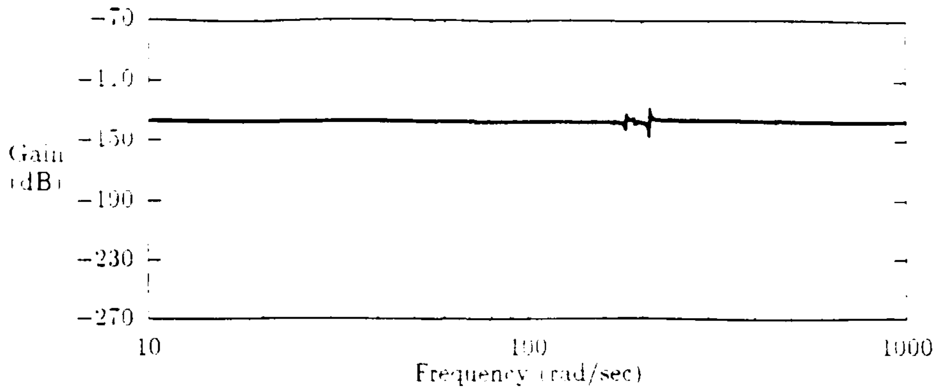

Figure D.133. 14-State Internally Balanced PMA 15 Y-axis Response

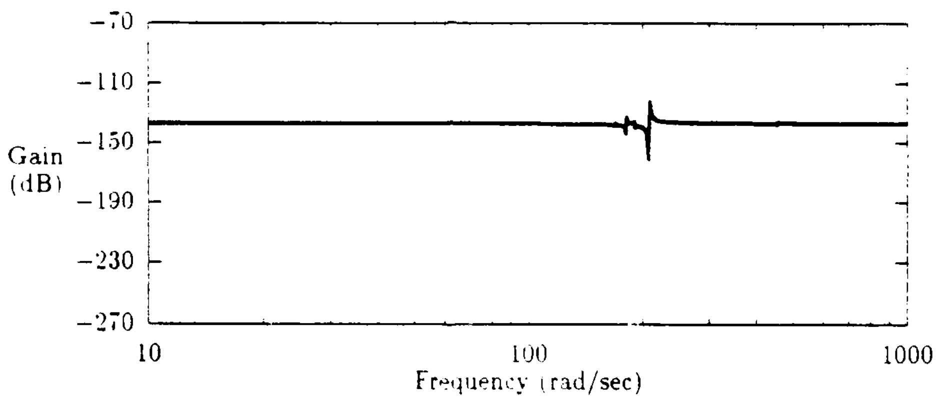

Figure D.134. 12-State Internally Balanced PMA 15 Y-axis Response

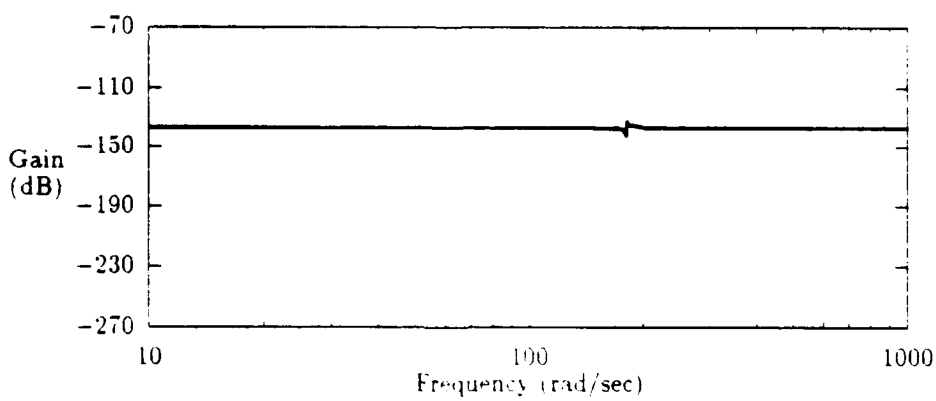

Figure D.135. 6-State Internally Balanced PMA 15 Y-axis Response

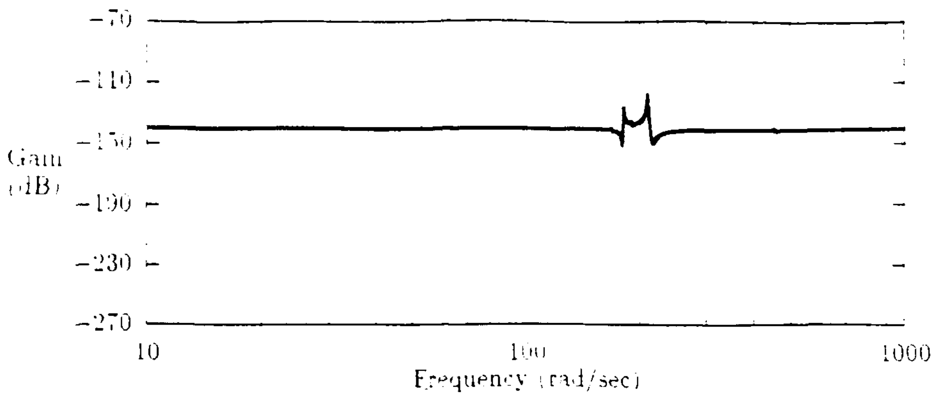

Figure D.136. 14-State Internally Balanced PMA 16 Y-axis Response

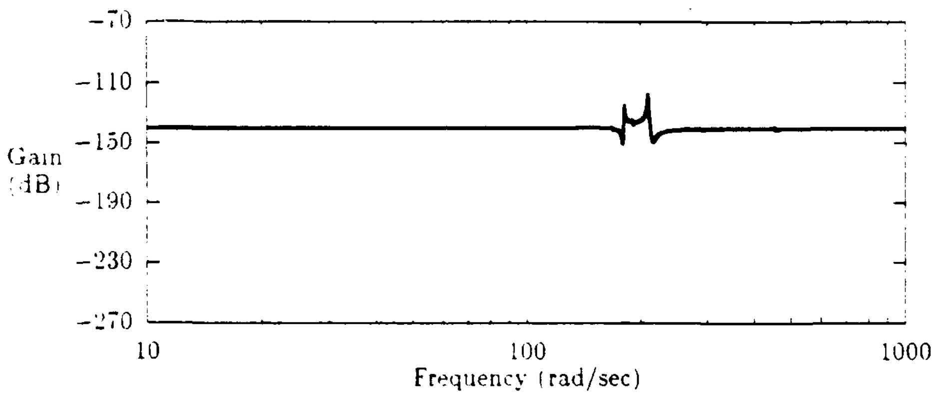

Figure D.137. 12-State Internally Balanced PMA 16 Y-axis Response

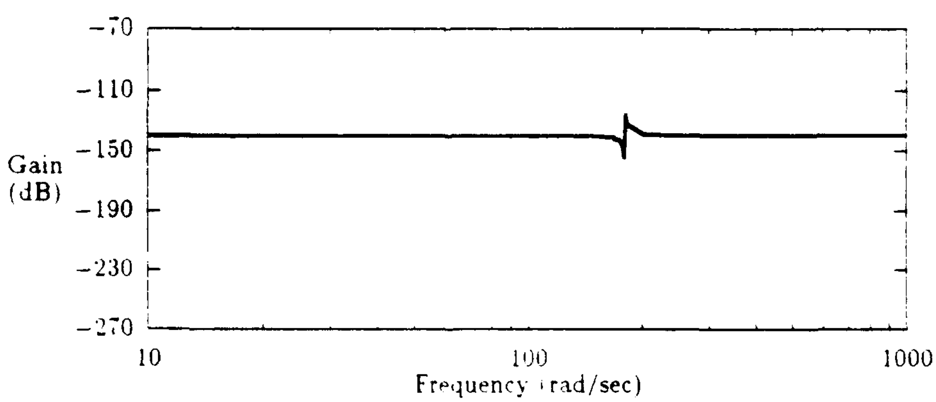

Figure D.138. 6-State Internally Balanced PMA 16 Y-axis Response

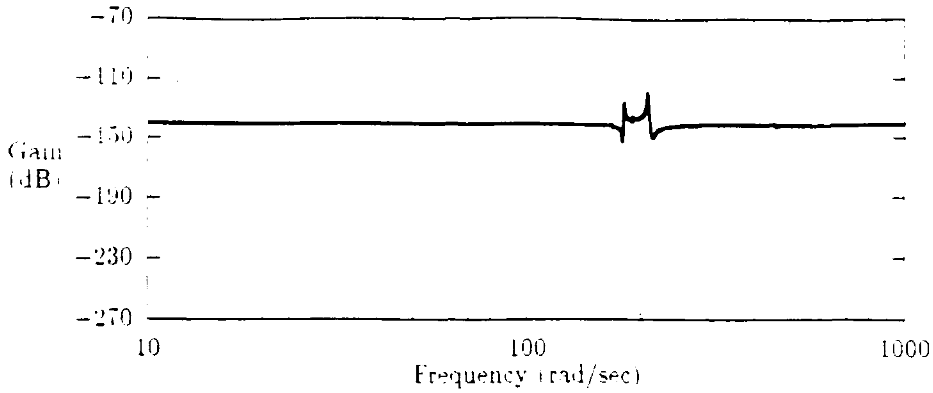

Figure D.139. 14-State Internally Balanced PMA 17 Y-axis Response

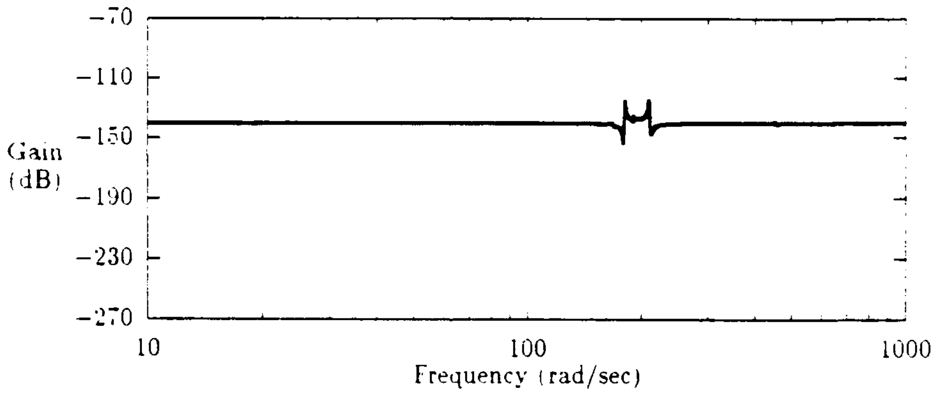

Figure D.140. 12-State Internally Balanced PMA 17 Y-axis Response

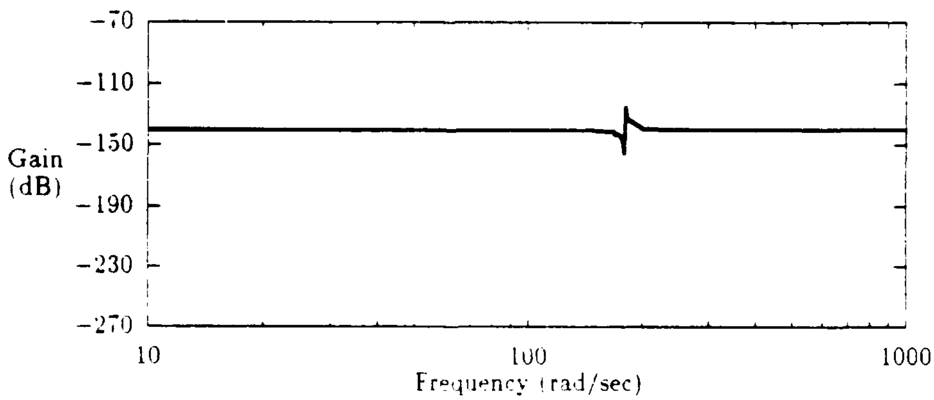

Figure D.141. 6-State Internally Balanced PMA 17 Y-axis Response

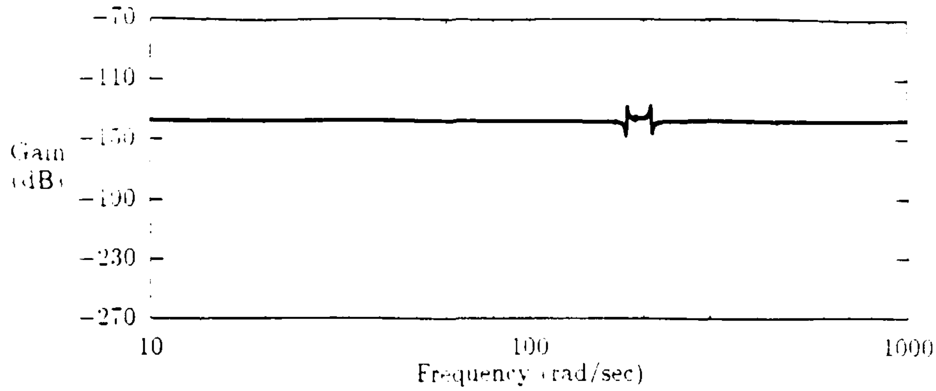

Figure D.142. 14-State Internally Balanced PMA 18 Y-axis Response

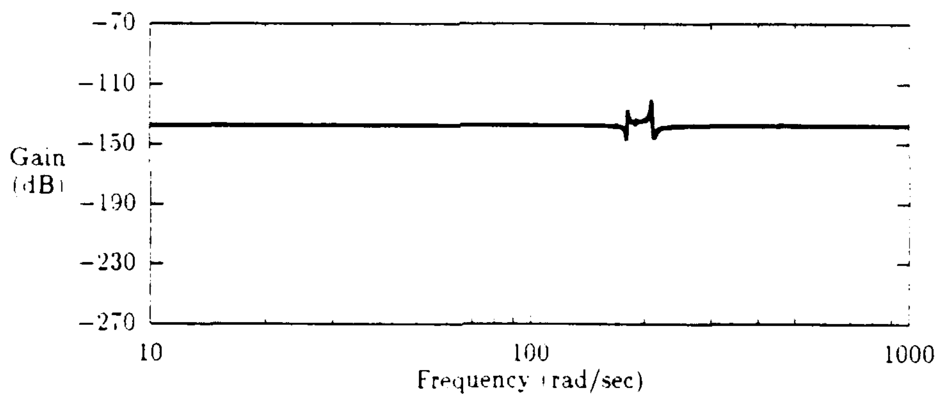

Figure D.143. 12-State Internally Balanced PMA 18 Y-axis Response

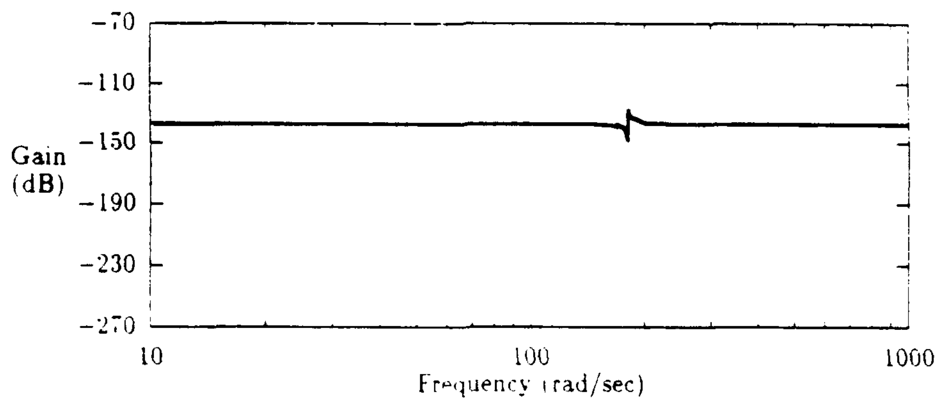

Figure D.144. 6-State Internally Balanced PMA 18 Y-axis Response

Appendix E. *Noise Matrices and Controller Weights*

E.1 Introduction

The dynamics driving noise values and controller weighting matrices weights determined for each of the cases described in Chapter 5 are presented in this appendix. The measurement noise covariance matrices are the same for all cases. The measurement covariance values obtained for the accelerometer are obtained from [16:V-69], and the measurement covariance values for the relative positions and velocities were obtained from Moyle's research [29]. The dynamics driving noise descriptions pertain to the discrete-time form, i.e., $\mathbf{Q}_d$ matrices versus $\mathbf{Q}$ matrices (see Section 3.4.3). The truth model $\mathbf{Q}_{d_t}$ matrices are the same for all cases. The truth model noise covariances were obtained from Carter (Carter coded the MATRIXx Spice model) [3]. The controller weights given refer to the ρ_x and ρ_u defined in Section 4.4.2. Initial controller weights were obtained from [16:V-63].

E.2 Truth and Filter Measurement Noise Covariance Matrices (for all cases)

$\mathbf{R}_t$ is a 54-by-54 diagonal matrix with the following diagonal terms:

First 18 terms = 4.8875E-07 $[\textit{meters per second}^2]^2$ $([m/s^2]^2)$

Second 18 terms = 2.7000E-07 $[m]^2$

Third 18 terms = 0.0000E+00 $[m/s]^2$

$\mathbf{R}_f$ is a 54-by-54 diagonal matrix with the following diagonal terms:

First 18 terms = 4.8875E-07 $[m/s^2]^2$

Second 18 terms = 3.1374E-07 $[m]^2$

Third 18 terms = 2.3710E-10 $[m/s]^2$

E.3 Truth Model Dynamics Driving Noise Covariance Matrix (for all cases)

$\mathbf{Q}_{d_t}$ is a 42-by-42 dimensioned diagonal matrix with the diagonal terms equal to 100.

E.4 60-State Filter Model versus 120-State Assumed Truth Model

E.4.1 Original **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_1}$ is a 24-by-24 dimensional diagonal matrix with diagonal terms equal to 350. Note that the reduction in dimension size in comparison to the truth model noise strength matrix is due to the measurement devices' (accelerometers') shaping filters being replaced with white noise.

- Control Matrix Weights

$$\rho_x = \frac{1}{[6.00E{-}07\ radians]^2} \qquad \rho_y = \frac{1}{[55.00\ newtons]^2}$$

E.4.2 Expanded **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_4} =$

Columns 1 thru 12

200.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	600.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	400.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	400.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	400.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	400.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	200.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	600.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	200.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	600.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	200.	0.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	600.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

Columns 13 thru 24

0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
200.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	600.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	200.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	600.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	200.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	600.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	400.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.	0.	400.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	400.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	400.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	400.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	400.

- Control Matrix Weights

$$\rho_\tau = \frac{1}{[6.00E-08 \ radians]^2} \qquad \rho_f = \frac{1}{[5.00 \ newtons]^2}$$

E.4.3 Special Tuning Case

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_1} =$

```
Columns 1 thru 6
```

1001.	0.	0.	0.	0.	0.
0.	2001.	0.	0.	0.	0.
0.	0.	1001.	0.	0.	0.
0.	0.	0.	1001.	0.	0.
0.	0.	0.	0.	2001.	0.
0.	0.	0.	0.	0.	1001.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 7 thru 12

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
1.	0.	0.	0.	0.	0.
0.	1.	0.	0.	0.	0.
0.	0.	1.	0.	0.	0.
0.	0.	0.	1.	0.	0.
0.	0.	0.	0.	1.	0.
0.	0.	0.	0.	0.	1.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 13 thru 18

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
1.	0.	0.	0.	0.	0.
0.	1.	0.	0.	0.	0.
0.	0.	1.	0.	0.	0.
0.	0.	0.	1.	0.	0.
0.	0.	0.	0.	1.	0.
0.	0.	0.	0.	0.	1.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 19 thru 24

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
1.	0.	0.	0.	0.	0.
0.	1.	0.	0.	0.	0.
0.	0.	1.	0.	0.	0.
0.	0.	0.	1.	0.	0.
0.	0.	0.	0.	1.	0.
0.	0.	0.	0.	0.	1.

- Control Matrix Weights

$$\rho_x = \frac{1}{[6.00E-08\ radians]^2} \qquad \rho_y = \frac{1}{[85.00 newtons]^2}$$

E.5 *134-State Filter Model verses 194-State Truth Model*

E.5.1 *Original* **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_d}$ is a 24-by-24 dimension matrix with diagonal values equal to 48.

- Control Matrix Weights

$$\rho_x = \frac{1}{[6.00E-07\ radians]^2} \qquad \rho_y = \frac{1}{[85.00\ newtons]^2}$$

E.5.2 *Expanded* **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_d}$ is a 24-by-24 dimension matrix with diagonal values equal to 70.

- Control Matrix Weights

$$\rho_x = \frac{1}{[6.00E-07 \ radians]^2} \qquad \rho_y = \frac{1}{[85.00 \ newtons]^2}$$

E.6 66-State Modal Filter Model verses 194-State Truth Model

E.6.1 Original **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_t}$ is a 24-by-24 dimension matrix with diagonal values equal to 650.

- Control Matrix Weights

$$\rho_x = \frac{1}{[5.00E-04 \ radians]^2} \qquad \rho_y = \frac{1}{[85.00 \ newtons]^2}$$

E.6.2 Expanded **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_t}$ is a 24-by-24 dimension matrix with diagonal values equal to 1170.

- Control Matrix Weights

$$\rho_x = \frac{1}{[6.00E-04 \ radians]^2} \qquad \rho_y = \frac{1}{[85.00 \ newtons]^2}$$

E.7 60-State Modal Filter Model verses 194-State Truth Model

E.7.1 Original **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_d} =$

```
Columns      1 thru      6

  5001.         0.         0.         0.         0.         0.
     0.      3001.         0.         0.         0.         0.
     0.         0.      1001.         0.         0.         0.
     0.         0.         0.      5001.         0.         0.
     0.         0.         0.         0.      3001.         0.
     0.         0.         0.         0.         0.      1001.
```

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 7 thru 12

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0	0.	0.
5001.	0.	0.	0.	0.	0.
0.	3001.	0.	0.	0.	0.
0.	0.	5001.	0.	0.	0.
0.	0.	0.	3001.	0.	0.
0.	0.	0.	0.	5001.	0.
0.	0.	0.	0.	0.	3001.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 13 thru 18

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
5001.	0.	0.	0.	0.	0.
0.	3001.	0.	0.	0.	0.
0.	0.	5001.	0.	0.	0.
0.	0.	0.	3001.	0.	0.
0.	0.	0.	0.	5001.	0.
0.	0.	0.	0.	0.	3001.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 19 thru 24

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
1001.	0.	0.	0.	0.	0.
0.	1001.	0.	0.	0.	0.
0.	0.	1001.	0.	0.	0.
0.	0.	0.	1001.	0.	0.
0.	0.	0.	0.	1001.	0.
0.	0.	0.	0.	0.	1001.

- Control Matrix Weights

$$\rho_x = \frac{1}{[5.00E{-}04\ radians]^2} \qquad \rho_y = \frac{1}{[85.00\ newtons]^2}$$

E.7.2 Expanded **H** *Matrix*

- Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_d}$ for the expanded measurement matrix simulation is identical $\mathbf{Q}_{f_d}$ determined for the original **H** matrix of this case (see Section E.7.1).

- Control Matrix Weights

Same as in original **H** matrix simulation of this case.

E.8 66-State Internally Balanced Filter Model verses 194-State Truth Model

E.8.1 Original **H** *Matrix* - Filter Model Dynamics Driving Noise Covariance Matrix

$\mathbf{Q}_{f_d} =$

Columns 1 thru 6

4000001.	0.	0.	0.	0.	0.
0.	1000001.	0.	0.	0.	0.
0.	0.	10001.	0.	0.	0.
0.	0.	0.	4000001.	0.	0.
0.	0.	0.	0.	1000001.	0.
0.	0.	0.	0.	0.	10001.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 7 thru 12

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
4000001.	0.	0.	0.	0.	0.
0.	1000001.	0.	0.	0.	0.
0.	0.	4000001.	0.	0.	0.
0.	0.	0.	1000001.	0.	0.
0.	0.	0.	0.	4000001.	0.
0.	0.	0.	0.	0.	1000001.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 13 thru 18

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
4000001.	0.	0.	0.	0.	0.
0.	1000001.	0.	0.	0.	0.
0.	0.	4000001.	0.	0.	0.
0.	0.	0.	1000001.	0.	0.
0.	0.	0.	0.	4000001.	0.
0.	0.	0.	0.	0.	1000001.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

Columns 19 thru 24

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
10001.	0.	0.	0.	0.	0.
0.	10001.	0.	0.	0.	0.
0.	0.	10001.	0.	0.	0.
0.	0.	0.	10001.	0.	0.
0.	0.	0.	0.	10001.	0.
0.	0.	0.	0.	0.	10001.

The trailing "1" in these values are a result of the code and tuning method implemented. The trailing "1" could be ignored without noticeable effect on the outcome.

- **Control Matrix Weights**

$$\rho_x = \frac{1}{[5.00E-04\ radians]^2} \qquad \rho_y = \frac{1}{[85.00\ newtons]^2}$$

E.8.2 Expanded **H** *Matrix*

- **Filter Model Dynamics Driving Noise Covariance Matrix**

$\mathbf{Q}_{f_d}$ is a 24-by-24 dimension matrix with diagonal values equal to 600000.

- **Control Matrix Weights**

$$\rho_x = \frac{1}{[5.00E-04\ radians]^2} \qquad \rho_y = \frac{1}{[85.00\ newtons]^2}$$

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December 1991 Master's Thesis

Control of a Large Flexible Space Structure Using Multiple Model Adaptive Algorithms

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The development and performance of moving-bank multiple model adaptive estimation (MMAE) and control (MMAC) algorithms for quelling vibrations induced in the SPICE 2 space structure are analyzed in this thesis. The structure consists of a large platform and a smaller platform connected by three legs in a tripod fashion.

The model supplied by Phillips Laboratory, Kirtland AFB is used to develop a truth model and multiple reduced ordered filter models. The filter models are developed from modal analysis and internally balanced techniques. Deviations of the line-of-sight vector from the center of the large platform to the center of the smaller platform are used for LQG controller performance evaluation.

For use with the LQG controller, research results indicate the chosen reduced order models are of inadequate dimension and that the full ordered filter model should be implemented to quell vibrations introduced into the structure. The parameter estimator implemented the ME/I algorithm, the moving-bank logic employed parameter position monitoring and the controller used the modified MMAC method. Parameter variations of two percent caused instabilities in the single filter/controller design. The MMAE/MMAC algorithms provide an excellent method to estimate a wide range of parameter variations and to quell oscillations in the structure.

Multiple Model Adaptive Estimation, Multiple Model Adaptive Control, LQG Control, Flexible Space Structure 476

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